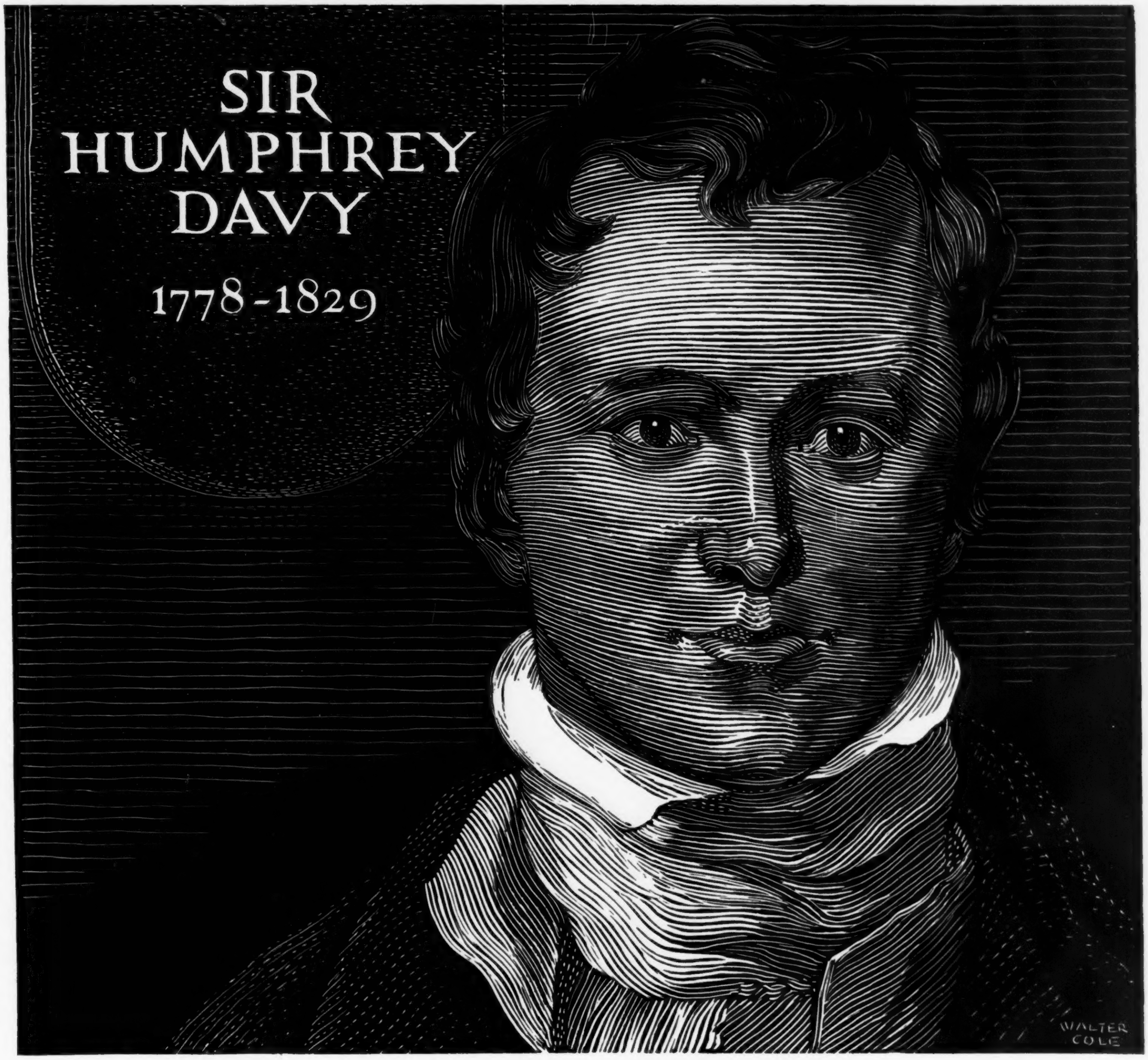
NUMBER THREE OF A SERIES OF FAMOUS PIONEERS IN CHEMICAL HISTORY



Apprenticed to a surgeon and apothecary at the age of fifteen, Davy was appointed to the Royal Institution in 1801 at the age of twenty-three and was knighted eleven years later. His health failed, however, while he was still at the height of his career and he died in 1829 at 51. Davy is said to have been one of the first to use the electric current for thorough and fundamental chemical investigation.

IN 1807 fashionable London paid twenty pounds a head to watch Sir Humphrey Davy at the Royal Institution perform the miracle of the age—to see him produce small quantities of metallic sodium by means of a new-fangled electrical apparatus. Davy's epoch-making discovery and his pioneer work with Faraday in experimental electricity marked the beginning of the modern electrolytic process for manufacturing caustic soda. Mathieson, pioneer producer of high purity caustic soda both by the electrolytic and ammonia-soda processes, has also pioneered the distribution of caustic soda in liquid form to large consumers. Mathieson Caustic Soda is now supplied to industry from three strategically-located producing points — Saltville, Va., Niagara Falls, N. Y. and Lake Charles, La.

The MATHIESON ALKALI WORKS (*Inc.*), 60 East 42nd St., New York, N.Y.

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH AND HTH-15 . . .

Mathieson Chemicals

AMMONIA, ANHYDROUS AND AQUA . . . PH-PLUS (FUSED ALKALI) . . . SOLID CARBON DIOXIDE . . . CCH (INDUSTRIAL HYPOCHLORITE)

The Reader Writes:—

Working a Free Horse to Death

Your editorial in the December number headed, "How Many Samples," has been read by the writer with interest, and it is not the chemical manufacturer or dealer alone who is annoyed only.

A few days ago the writer was advised by one of our representatives that several months ago he furnished a five gallon sample of cutting oil, free of charge, at the request of a metal working concern in this neighborhood and after following this up for several months, he was finally frankly told by the party in charge that they had not bought any cutting oil for several years, as more than a dozen concerns, one after another, had furnished them with five gallon lots free on their pretext that they would make a test of it. The party seemed to pride himself on his sharpness. We did not use the language, nor would you print it if we did, that would describe our opinion of such a human being.

Newark, N. J. C. R. Burnett, President,
American Oil & Supply Co.

Tariff Warning!

William B. Bell's timely warning on the tariff delivered at the recent luncheon meeting of the Synthetic Organic Chemical Manufacturers' Association is amply justified by the disclosure this morning of several important tariff reductions in chemicals in the U. S.-Netherlands Pact. If any present at that meeting felt that Mr. Bell's fear of serious tinkering with the chemical tariff structure by the present Administration is purely imaginative and unwarranted, they must certainly agree now that Secretary Hull and his associates are not particularly well-informed on chemical matters generally and the relationship of the industry to the question of self-defense. Protection for the industry has been accorded by both Republicans and Democrats alike in the past. But then we all must agree that the word Democratic as applied to the present Administration is decidedly a misnomer.

New York City Walter Williams

Exposition Visitors

One of my associates who has just returned from his first visit to the Chemical Exposition has brought back two fresh, first impressions that it seems to me are worth pointing out to the chemical industry and the exposition officials.

Your own display of "313 New Chemicals of Commerce" and the "Children of the Recovery" of the American Chemical Society were to him the outstanding exhibits; but he criticized the inclusion of copper-sulfate—even if from a new manufacturer—in your display; and the lack of discrimination in describing anything and everything as if it were an epoch-making scientific discovery by the labels at the A. C. S. Show. He was unfavorably impressed with the small number of real chemical exhibits, and noted that neither du Pont nor Allied Chemical and Dye, our biggest chemical companies, were present. He made a contribution to the complaint of exhibitors as to the quality of the visitors by noting that the horde of young students made it very difficult for a serious visitor to see what he wanted to or to talk with those in charge of the various stalls.

Commenting on his comments it seems, to one who has in years gone by been familiar with previous Chemical Shows, that it should not be impractical to work out some sort of censorship in such displays as you and the A. C. S. make. In the same vein, the free distribution of admission tickets is not so advantageous, either to exhibitors or visitors, as a discriminatory control that would better the quality of the attendance.

How these various improvements might be brought about I do not know, but that is the business of those more closely concerned with the success of the Exposition, but I am sure they would be worth while.

Boston, Mass. Vernon Davis Hall

What the Chemical Exposition needs is a first-class air conditioner in practical operation.

Jersey City, N. J. Albert Bond, Jr.

Why call it a Chemical Show when there are so few chemicals and so much machinery shown? For a real chemist your exhibit was quite 'the whole show." Thanks and congratulations.

New York City R. S. Spillman

New Uses for Chemicals

I was particularly interested in your review of "New Chemicals of Commerce" and want to congratulate you on the way this was handled. Such summaries are especially valuable to anyone who is dealing mainly with new developments.

Your article brings out vividly the striking thing in our present day development, which is, unquestionably, the increasing importance of *application work*, involving the search for new uses for old and new chemicals. Each manufacturer stresses how his product can be *used*. This activity is characteristic of present day chemical developments and very different from conditions existing ten years ago.

More and more, chemists are being employed today in application work, and gradually the chemical companies are developing an improved technique in handling such problems. As a result, we have the need for more technically trained men for sales work, and there is created a greater demand for chemists for both application and sales fields. These are important developments, and while many are aware of these facts, I believe they are not as generally recognized as they should be.

St. Louis G. DuBois
Vice-President, Research and Development,
Monsanto Chemical Company

Carbon Copy for Filing

One of our readers writes to *Time* magazine as follows:

"You probably cannot find all of the complimentary statements that appear in the press, hence I am sending this note from Chemical Industries for November.

"'Keeping Step with "Time"

"'Read it from cover to cover. Chemical Industries is to our industry as "Time" is to the nation.

"'Owego, N. Y. W. A. Bridgeman,
Wilbur-White Chemical Co.'

"I would have you understand that Chemical Industries is very highly thought of by the big fraternity of chemists."

Morgantown, W. Va. Friend E. Clark,
Head of Chemistry Department
West Virginia University

CHEMICAL INDUSTRIES

VOLUME XXXVIII NUMBER 1

Industry in Politics

THE anti-business complex of the present Administration has been made quite clear. So, having at long last been convinced that, despite high sounding protestations of disinterestedness and co-operation, our business interests are always going to be promptly sacrificed by the President to any political expediency, our industrial leaders have been forced into open, political opposition.

We approve no more of the political organization of Industry than we do of the activities of any organized minority to secure political action. But almost from the advent of the New Deal we have recognized that the impress of Government action has become the single, most important factor in the industrial situation. Accordingly, we have not hesitated, first; to urge the business point of view upon Washington, and latterly, to point out the dangers of the Roosevelt program. For this we have been criticized as stepping outside the bounds of an industrial magazine's proper activities. It is the President himself who has not only carried Government into business, but has also forced Industry into politics.

Industrial interests, in the narrower sense, are but a side issue of the political campaign. In their broader meaning, however, industrial interests represent the economic mainstay of the nation. State rights are not more clearly defined than corporation rights. Personal property is quite as much a part of the American scheme as personal liberty. Free contract is as important as free speech. The coming campaign will be a bitter battle with decisive results. Industry has a great stake in the outcome. This is no jockeying for political favor. Industry faces grave risks of political reprisals. Its position and its leadership put upon it serious responsibilities for fair and effective political opposition.

Seeking for New Chemical Markets

The modern version of the wise old saying, that it is easier to find a new chemical for an old use than it is to discover a new use for an old chemical, finds expression in that commercial research which is taking its place along with laboratory experiments and unit plant work in the chemical industry's development program. Gaston du Bois—certainly a capital authority—points out, in a letter published in this issue, that this betokens not only a change in method, but also a change in spirit; a revision both of research and of merchandising.

Among all our larger chemical corporations, it is now thoroughly standard practice painstakingly to try out the industrial reactions of every new product, and there is an increasing tendency to market them strictly upon the basis of specific uses. It follows naturally that more and more of these products are merchandised as chemical specialties, a branch of the business that is so rapidly assuming greater importance, that we are prompted considerably to expand the space allotted to it and to segregate this material in a section all its own.

The Inorganic Renaissance

It is forty years since Mathieson and Dow began the first commercially successful operations of the electrolytic alkali process in this country. Since that time there have been refinements both in this and the older soda-ammonia process; but until very recently there has been no technical development of revolutionary scope in this important branch of our inorganic chemical industry.

Within the past few months, two radical departures from established alkali technique have been worked through the pilot plant by the Allied and the Westvaco companies. A third is reported beyond the experimental stage under Hooker auspices. While lacking the sensational news value of the synthesis of the new hexahydric alcohols or the large-scale production of crystal urea, these major developments in the heavy chemical field are recognized, we think quite properly, in our annual review as likely to become the most notable chemical events of 1935.

It is roughly a century since the foundations of the heavy chemical industry were laid down in England. The practical manufacture on an industrial scale of the alkalies, the mineral acids, Glauber's salt, salt cake, the alums, the more important salts of potash, tin, copper, and iron, together with the cyanides and the mineral pigments were all worked out by a group of men who were at once chemist, engineer, and industrialist. William Gossage, James Muspratt, Henry Deacon, Weldon, Shanks, Gamble, Kurtz, Tennant, Allhusen, and Spence very thoroughly explored the reactions leading to the production of all the heavy chemicals. Their names are indelibly associated with processes, apparatus, even with products; and they left in their notes, their laboratory records, and their patents a rich store of inorganic chemical lore. It is extremely interesting to note that the three "new" alkali operations all date back to their time and are today made practical because of improvements in our industrial technique.

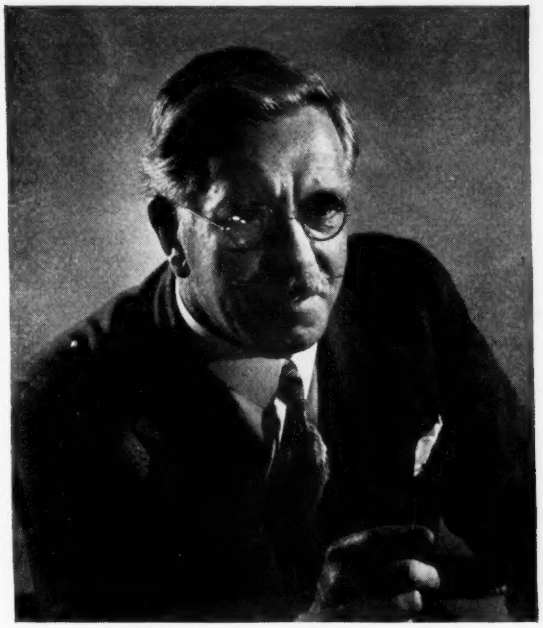
In the light of our new engineering materials, new apparatus, our ability to handle high pressures and temperatures, our knowledge of catalysts, our greater control, we look to see, during the next decade, a thorough re-exploration of these old fields yielding satisfactory commercial results. For the past twenty-five years, the fascinating and widespread domains of organic chemistry have rather monopolized our attention, but there promises to be an inorganic renaissance which, when we remember the basic importance of these chemicals, may well lead to dramatic developments in many branches of the process industries.

Chemical Councillors

Co-ordinator Berry's list of "chemical councillors" is a very revealing roster. Heavy chemicals, the alkalies and chlorine, fertilizers and insecticides, dyes and other organics, alcohol and other solvents, carbon black and pigments, to say nothing of plastics and lacquers—all these are quite unrepresented, so that he stands forth in the remarkable position not of trying to produce Hamlet with the Melancholy Dane; but of attempting to play that distinguished role without the King, his father or his step-mother, Queen Gertrude, without Ophelia, Horatio, Laertes, or even the philosophical grave-digger.

Why he has elected to go ahead with a group of men who, however important they may be as chemical consumers, would not themselves claim to represent the real chemical producing power of the United States, is perfectly plain. He must make a showing, and he dare not invite councillors representing industrial groups antagonistic to his resurrection of the N.R.A. ideas.

So, then, this is the end of the noble experiment in co-operation between Government and Industry.



W. Cassels-Brown talks to Williams Haynes about

Chemical Industry Upside Down

IN New Zealand it is now mid-summer. In New Zealand a day laborer is paid half a dollar an hour and a first-class stenographer fifteen dollars a week. The ragwort, a pretty, little golden-flowered weed that grows here a foot or eighteen inches, is in New Zealand a seven-foot menace to agriculture. The largest New Zealand fertilizer factory is owned by a cooperative group of dairymen.

Under such topsy-turvy conditions, especially so since agricultural chemicals—fertilizers and weed killers—are the only important products of the New Zealand chemical industry, one might reasonably expect novel methods of manufacturing and merchandising. Accordingly, when the superintendent of that largest fertilizer factory was in New York last month, it was with extraordinary curiosity that I carried him off to lunch at the Drug Club to get at first hand the story of a chemical industry that not only geographically, but also economically and technically, appears to operate upside down.

But any globe has two sides (which I had clean forgotten in my curiosity about New Zealand) and it was disconcerting to find that Mr. Cassels-Brown finds some of our national conditions and chemical methods quite heels-over-head.

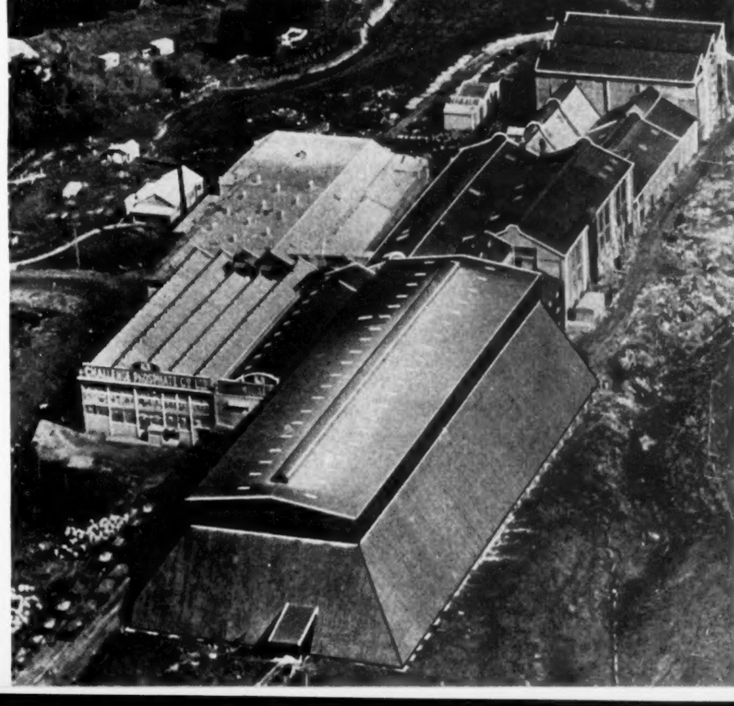
"When I landed in San Francisco, being naturally interested in foodstuff prices, I stopped in front of the first butcher-shop I passed; and there in the window were two great placards announcing: 'Bacon, 42c a pound' and 'Fresh-killed Turkeys, 28c a pound,'" was the way he began.

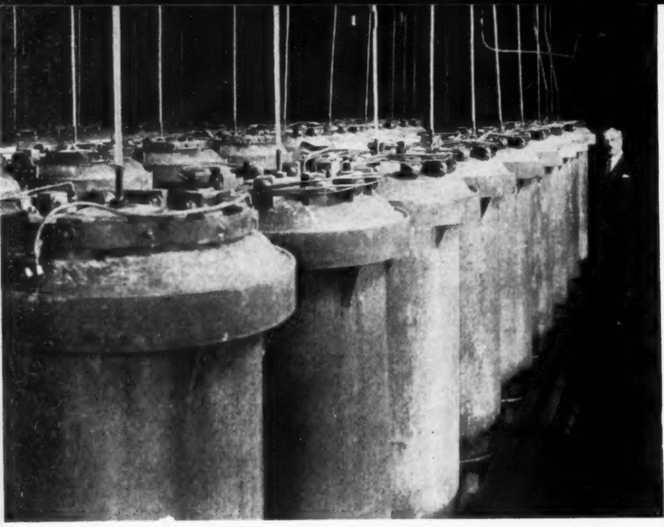
"Now everyone who knows anything about either hogs or poultry," he continued, "knows perfectly well that on the labor involved and the feed necessary to make a pound of marketable meat, if bacon is worth 42c, then turkey is worth 60c; or if turkey sells for 28c, then bacon should not bring more than 18c. So you see," he added with a twinkle in his grey-blue eyes, "I learned, almost as soon as I landed here, that you in the States must be living under a very much disarranged economic system; and that so far as your agriculture is concerned your tariffs, your crop restrictions, your bounties for killing little pigs, your loans on surplus crops, and what not, have simply put all your farm markets in a make-believe world of false values. In New Zealand I used to wonder how butter and cheese we shipped to London could ever be sold in New York, now I am surprised our British selling company has sold so little here."

"Let's follow that thought a bit further," I suggested, "and right into the chemical industry. In our making and marketing of chemicals, what strikes you as being topsy-turvy?"

He stroked his heavy mustache and twisted its neatly waxed ends. A competent chemical engineer and a conscientious Englishman, he was plainly not going to deliver a snap judgment. What he said bears weight for he has had a long, varied experience in chemical plant operation, going back to when, as a youngster, he entered the chemical works of Wm. Cooper & Nephews, in England.

"Naturally," he said, "I have been most interested in the fertilizer industry here and am able to discuss





The new electrolytic cell-room where The Challenge Phosphate Company has recently started production of sodium chlorate as a weed killer.

it only as a visitor; but I am greatly impressed with two big economic wastes. The first is your exceedingly high costs of distribution, and the second, the unnecessarily large range of mixtures. I understand that one plant this year divided its output of 20,000 tons into 971 different mixtures. In all your chemical plant operations, I seem to observe a certain unbalance of efficiency, one department being ultra-modern in equipment and technique, while another will be outworn and haphazard both in apparatus and in process. In one plant I visited, which in most respects was well designed and up to date, the lack of mechanized plant in one department put their labor costs at 31c a short ton where our costs in New Zealand are 6c per long ton; U. S. A. wage scale 25c; N. Z. wage rate 41c. I miss the feeling of a well rounded operation such as one gets in the old chemical plants at home in England and in Germany, or in our own new works in New Zealand."

He would not be tempted into detailed comparisons, but laughingly said, "No, it is more polite to let your readers make their own comparisons after I tell them something about the way we operate in New Zealand.

"The Challenge Phosphate Co. is a link in a big industrial, agricultural, and mercantile group that is the outgrowth of a cooperative dairying organization initiated and managed by Mr. William Goodfellow, New Zealand's outstanding industrialist, and our own Managing Director. Our Chairman is Sir William Hunt, commercial leader and our great practical economist. Our parent company, as it were, is the New Zealand Co-operative Dairy Co., which has a yearly turnover of over $35,000,000. Under Mr. Goodfellow's able leadership our group operates the largest coal mining company, and also extensive lime quarrying, in addition to our fertilizer works with an annual capacity of 120,000 tons of superphosphate.

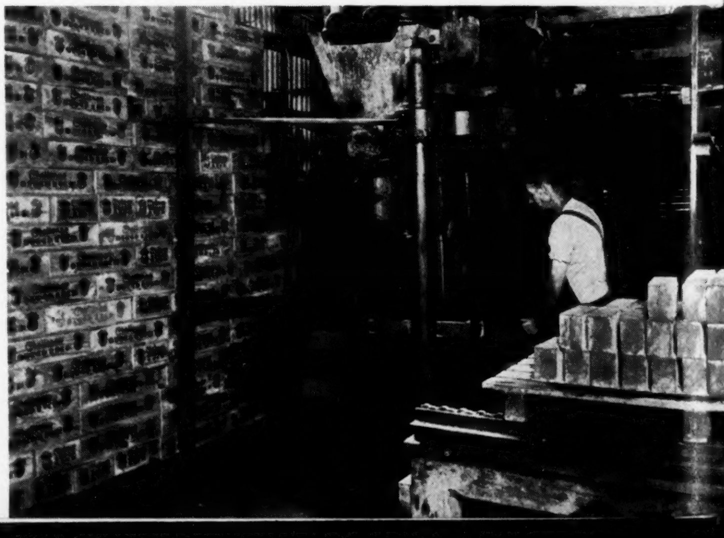
"Of our output 95 per cent. is confined to the 20 per cent. grade of super, ammoniated super, and basic super. We regularly make lime-super and potassic-super mixtures, and we do manufacture a limited quantity of a complete mixed fertilizer; but if we have an order for any special formula, we make a charge of 84c a ton for mixing. The mixtures we regularly produce have all been scientifically worked out best to serve the needs of our soils and crops, and we propagandize them thoroughly by means of our magazine, *The Challenge Adviser*, which goes each month to 37,000 readers.

"We have from time to time brought in considerable quantities of Florida phosphate, and like it better than ock from Morocco; but our raw material now all comes from the two South Pacific phosphate islands, Nauru and Ocean, which are worked and administered by the British Phosphate Commission. For this enterprise the capital was supplied by the Governments of Great Britain, 45%; Australia, 40%; and New Zealand, 15%; and we are entitled to import of the total output in this proportion. However, at present, England is drawing no phosphate from the Commission, and Australia is taking about 70% and New Zealand the balance. The Commission, after paying 6% on the invested capital and meeting all costs, sells virtually at the production price.

"Besides superphosphate, we manufacture a special cattle lick developed by the experts of our Agricultural Department, containing salt, iron oxide, sulfur, and potassium iodide. Recently, we have embarked on the manufacture of sodium chlorate. Our plant at Otahuhu, employing the electrolytic process, is the first in the whole of the Southern Hemisphere to produce this important weed killer.

"You can hardly appreciate the importance of this chemical to our New Zealand farmers. Years ago, so the story goes, a dear old lady from Scotland brought over in a little pot a tiny plant of common ragwort. In New Zealand this grows to tremendous size and spreads quickly. Thirty thousand seeds ripen in one flower head, and a two-year old plant will have from a dozen to fifteen such flower heads. In our experimental plots we found that in ordinary pasture land some forty seedlings spring up per square yard. It propagates also from offsets from the roots, and if dug

The packing and packaging room in the caked salt department, where cattle licks of special chemical formulas are put up for the consumer.



W. Cassels-Brown in informal pose.

up or plowed under, a score of new plants appear from the bits of broken roots. Sodium chlorate is the best, indeed the only, effective way of fighting this pest, which our farmers have nick-named 'The Yellow Peril.'

"Our fertilizers, salt licks, and chlorate are all made primarily to supply the dairy companies associated with us. These, in turn, sell to the farmers who commonly come in and take out say, six tons of super, to be charged equally against their next six monthly milk checks. But we also sell to the big mercantile jobbing companies who do a large independent business. We have but two discounts, for jobbers and for the cooperative dairies, both of which work upon a very close margin, so that there is no price cutting and the cost to the farmer is very low.

Our Tariffs, A. A. A. and Middlemen

"We seem indeed to have topsy-turvy ideas of farm economics, judged from what your Government is trying to do. To plow under, even to restrict a crop, seems to us a wicked act. We believe in curing underconsumption by lower prices and to maintain farmers' profits by lower costs. All your obstructions—high tariffs, the A.A.A., too many middlemen—hamper the flow of the efficient producers' goods. If these barriers were swept away, there would be less talk of low wages, and with increased consumption, there would soon be no unemployment. In no country is the standard of living so high that it might not be raised; and there is little work so hard that 40 hours a week is too much for a person well fed, well housed, and well clothed. Help the farmer, but help him get his goods to the consumer quicker and cheaper; and you will help them both. That's our way of thinking. I wonder if it is so upside down as it must seem compared with what your Government is trying to do?"

U. S. Petroleum Reserves

Proven underground reserves of petroleum in known fields of the United States are estimated at more than 12,177,000,000 barrels in a book reviewing progress in the petroleum industry soon to be published by the American Petroleum Institute. It is explained that the estimate covers only petroleum which may be extracted by ordinary current methods of production under prices prevalent on January 1, 1935—the date of the estimate—and does not include an indeterminate quantity left in the ground by present producing methods, but recoverable by advanced methods of production, such as water drive, under prices higher than those of 1935.

The estimate, based upon data obtained from numerous reliable sources by the Institute's Special Committee on Production and Supply, with particular weight given to estimates made by experts familiar with the various oil-producing fields and districts, gives Texas the largest proven reserve, 5,500,000,000 barrels. California is estimated to have the second largest reserve, 3,500,000,000 barrels. Oklahoma is third with an estimated 1,200,000,000 barrels. A few states with known but small reserves were omitted from the compilation.

Following are the estimated reserves in known fields as of January 1, 1935, by states:

California		3,500,000,000 bbls.
Rocky Mountain States		322,000,000 "
Wyoming	250,000,000 bbls.	
Montana	60,000,000 "	
Colorado	12,000,000 "	
Central and Southern States		7,900,000,000 "
New Mexico (S. E.)	350,000,000 "	
Texas	5,500,000,000 "	
Oklahoma	1,200,000,000 "	
Kansas	400,000,000 "	
Arkansas	75,000,000 "	
No. Louisiana	55,000,000 "	
Coastal Louisiana ...	350,000,000 "	
Eastern States		455,000,000 "
Illinois	35,000,000 "	
Indiana	5,000,000 "	
Kentucky	35,000,000 "	
Michigan	45,000,000 "	
New York	40,000,000 "	
Ohio	30,000,000 "	
Pennsylvania	240,000,000 "	
West Virginia	25,000,000 "	
Total United States ...		12,177,000,000 "

Industry's Bookshelf

Fuel. Solid, Liquid, and Gaseous, by J. S. S. Brame and J. G. King, 422pp. Edward Arnold (London). $8.50.

Brame has collaborated in this fourth edition, with Dr. J. G. King, outstanding authority in touch with researches and developments in fuel technology. The combination is a happy one particularly in the discussion of hydrogenation, recent important advance.

Outposts of Science, by Bernard Jaffe, 547pp. Simon & Schuster. $2.00.

As in "Crucibles," Jaffe tells this story through the lives of men, and the visits which he records summarize modern research problems after four years of study and travel to the greatest laboratories of the world.

American Chemical Industry Marches On

A Résumé of 1935

DURING the past year—the three hundredth since John Winthrop, Jr., started the first American chemical plant—American chemical industries have made notable gains, measured by any one of several different yardsticks.

Expenditures on the industries' capital account for plant and equipment may be estimated at about 60 million dollars, or half again as great as in 1934. The spread of activity is wider since the total does not include anything comparable to the big plant expansions of the previous year by the three alkali companies.

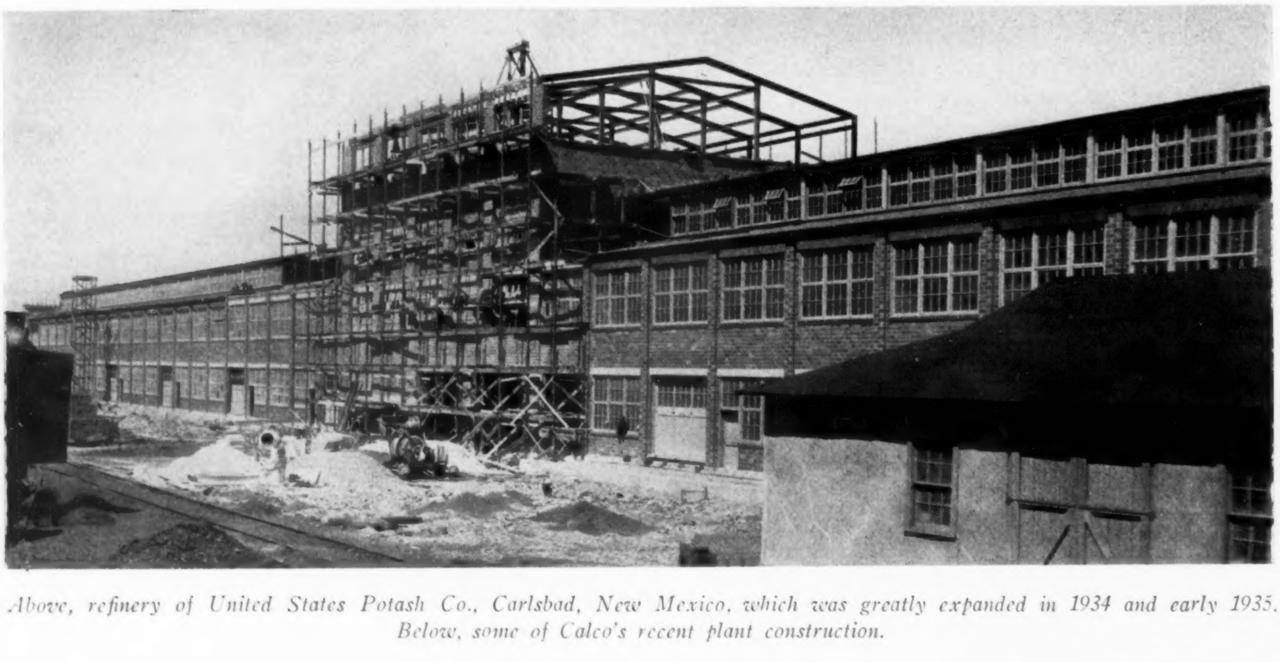
Volume of trade (expressed in tons of chemicals shipped) has returned, so all agree, to the totals of 1928. Several of the best informed sales departments estimate that 1935 tonnages are as much as 20 per cent. above that boom year's shipments.

Profits, as indicated by the earnings reports of the companies listed on the stock exchanges, are distinctly better than at any time since 1930. As a natural result, the value of chemical corporation shares (as shown in the accompanying table) has made a rather sensational advance during 1935.

The past year has seen the commercial introduction of a number of promising new chemical specialties and the development of new chemical consuming processes, indicating that the industry is reaping the fruits of its well sustained research programs.

While there has been but very small increase in the number of ordinary workmen employed in chemical works, nevertheless the re-employment of trained technical men has been very great. There is no longer any acute emergency of unemployment among competently trained chemists and chemical engineers.

Looking forward, the year coming will see, barring unexpected political developments, a continuation of greater expansion in plants and equipment. Thirty chemical manufacturing companies,* recently canvassed by CHEMICAL INDUSTRIES, report that during 1935 they have spent a total of $16,711,567 on new plants and equipment, and the same companies estimate their ex-



Above, refinery of United States Potash Co., Carlsbad, New Mexico, which was greatly expanded in 1934 and early 1935. Below, some of Calco's recent plant construction.

penditures in 1936 will be $22,076,000. The average per company is for '35, $557,052 and for '36, $735,866.

From the commercial point of view the alkalies again hold the center of the stage. The well supported demand for chlorine carries with it the unpleasant promise of an unbalance in the stocks of caustic soda, produced jointly in the electrolytic process. The coming year will see significant developments in this field. Columbia Alkali, hitherto an ammonia-soda operator, is building, at an estimated cost of a million and a quarter dollars, an electrolytic plant at Barberton, Ohio. At the Allied plant at Hopewell, a pilot plant producing chlorine and nitrate from salt has been operating several months, and their new million dollar plant to work this process on a commercial scale will shortly be in production. More than this, it is reported that one company is rapidly developing a process in which muriatic acid is burned with oxygen to produce chlorine, while Westvaco is now working the dissociation of muriatic acid by means of low voltage electrolysis.

	Last Closing 1934	*Closing* *Dec.* 19, 1935
Allied Chemical & Dye Corp.	137½	149
American Agricultural & Chemical Co.	47	51¼–51¾*
Columbian Carbon Co.	74¾	94
Commercial Solvents Corp.	21⅝	20¼
Dow Chemical Co.	90½	95
E. I. du Pont de Nemours & Co.	95⅝	135⅞
Eastman Kodak Co.	112	155½
Freeport Texas Co.	25¾	27⅛
Hercules Powder Co.	74½	83
International Agricultural Corp.	4⅝	4
Mathieson Alkali Works	28⅝	30¼
Monsanto Chemical Co.	59	85
Penn. Salt Mfg. Co.	75	115
Texas Gulf Sulphur Co.	34¼	31¼
Union Carbide & Carbon Corp.	47⅛	70¼
United Carbon Co.	49¼	68¼
U. S. Industrial Alcohol Co.	44½	43½
Virginia-Carolina Chemical Co.	3½	3⅞
Westvaco Chlorine Products, Inc.	21½	23

* Bid and asked.

The outstanding new plant of the year is, of course, the Carbide & Carbon Chemicals Corporation works at Whiting, where the waste gases from the nearby petroleum refineries are worked up chemically in operations similar to those employed in their works at Charleston, W. Va. It is persistently rumored that the same company is projecting a third operation of the same kind in the Oklahoma or Texas fields. Other notable new plants are the three million dollar titanium works of National Lead at Sayreville, N. J.; the new Krebs pigment works at Newark, Del.; and the recently completed synthetic rubber and crystal urea units of the du Ponts at Deepwater, N. J., and Belle, W. Va. U. S. Industrial Alcohol at Baltimore, Westvaco at Charleston, and Monsanto at St. Louis have all installed new, larger power plants with a more or less thorough overhauling of their entire operations. Calco have carried through a very considerable expansion program, which has been going on for the past two years and which has included in 1935 the transfer of the old Klipstein operation from Charleston. Offsetting this departure, that growing chemical center is gaining a new plant in the synthetic aromatic chemical works of Givaudan-Virginia, subsidiary of Givaudan-Delawanna. At East St. Louis, Monsanto has two new units, one devoted to chlorine production. Two American companies have made large investments in foreign plants: Commercial Solvents in England and du Pont (rayon) in the Argentine. Important new laboratories have been started by Dow (physics), by Mallinckrodt (control), and by American Cyanamid (research) at Stamford, Conn.

Among the laboratories, however, the most interesting is the Haskell Laboratory of Industrial Toxicology, established by the du Ponts. Here, intensive scientific research will be carried on, with every chemical and medical aid, to determine the effects upon human beings of all the old chemical products of known toxicity as well as to test all the new products, together with exhaustive examinations into the methods of prevention and the means of cure. This is a much needed work, since the entire subject of industrial toxicology is badly explored and much confused with sentiment and prejudice. Accurate determination of the facts is much needed.

Rubber accelerators and plasticizers have been replaced during the past few years as the greatest contributors to the new chemical developments by synthetic resins, plastic impregnating materials, and solvents. Developments in these specialty fields have come thick and fast, and it requires a couple of years' acid testing in the actual commercial use of this host of new products to determine their relative values. The synthesis of two hexahydric alcohols from corn sugar by Atlas Powder is obviously a notable addition to the glycerin-glycol series, and in the more prosaic field of inorganic chemicals, the Carus Chemical Company has made a real contribution in marketing several new permanganates—zinc, sodium, calcium, lithium, and barium. Sodium hexametaphosphate (Calgon) and tetra sodium pyrophosphate (Warner Chemical Co.) are likely additions to the detergent list, while chlorinated rubber, crystal urea, and ammonium sulfocyanate are all now available from American sources of supply. Some idea of the extent and diversity of new chemical products coming to commercial fruition may be had from the fact that at the Chemical Exposition, in New York, the first week of December, CHEMICAL INDUSTRIES displayed 313 such items marketed since December, 1933, by its advertisers.

The Dow acquisition of the Cleveland Cliffs wood chemical operations is already heading definitely towards an exploitation of the Scholler-Tornesch process for the saccharification of wood, with a single plant unit already in operation. It is said that a ton of dry wood is producing 50 gallons of alcohol and about 400 pounds of lignin, for which a market is developing as a source of humus plant food. The residue wood is reported to lend itself most admirably to the production of decolorizing carbon, an item which Olson had begun

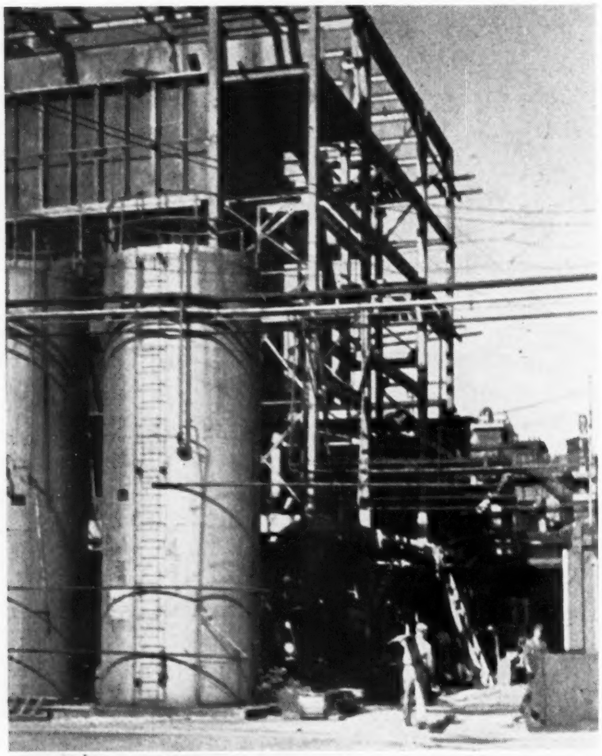
* These companies are American Chemical Products; American Cyanamid; American Potash; Anderson-Prichard; Bakelite; Binney & Smith; Henry Bower; Calco; Columbia Alkali; Martin Dennis; Dow; Electro Bleaching Gas; Innis, Speiden; Irvington Smelting; John D. Lewis; Mutual Chemical; National Aluminate; New York Quinine; Penn. Coal Products; Penn. Salt; Sterling Products; Union Carbide & Carbon; U. S. I.; U. S. Potash; Victor Chemical; Westvaco; Wishnick-Tumpeer; Jacques Wolf; Wood Chemical; Zinsser & Co. It is to be noted that several of the largest companies have been omitted purposely, as their heavy capital account expenditures would upset what has been carefully compiled to be an average representative of the industry as a whole.

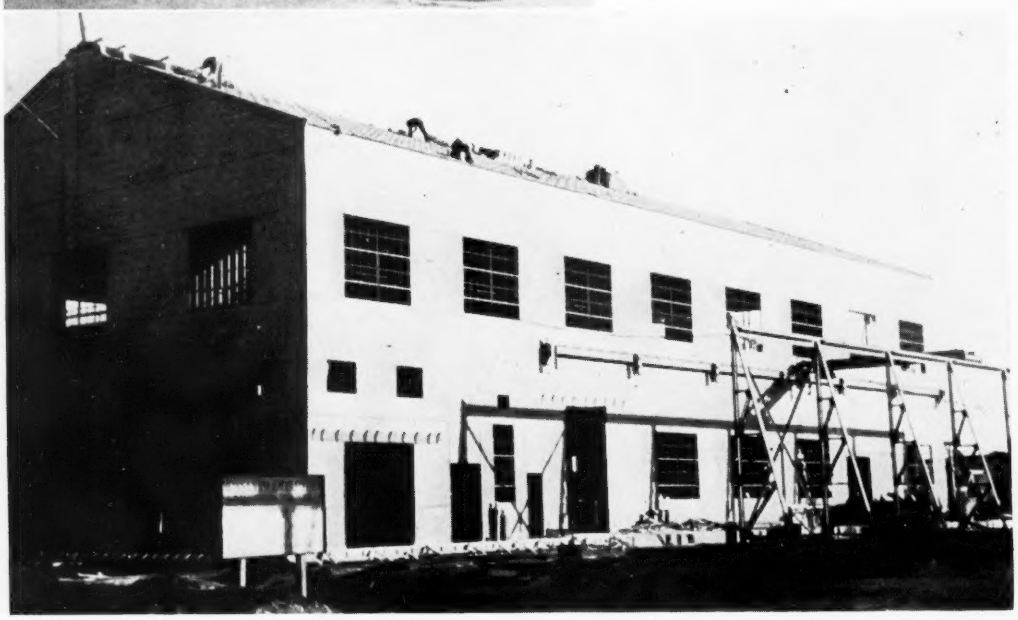
to develop before Dow took over the Marquette plant. Monsanto's acquirement of the Swann interests promises a vigorous exploitation of the diphenyls, and a thorough-going consolidation in the interests of a more closely knit organization.

Chemicals consumed in the petroleum industry multiply in numbers and increase in quantities. Since the solvent extraction of lubricants has become common, the use of antioxidants has grown markedly. The importance of this business is indicated by the fact that one gasoline company is using 400,000 pounds of alpha naphthol for this purpose, and this growing market prompts some commercial moves of interest. The Gasoline Antioxidant Co. has resulted from a pooling of patents by du Ponts, Standard of Indiana, Standard of New Jersey, and Puroil. Its principal product is para benzyl aminophenol. A similar group is being built up around Dow and Continental Oil for the manufacture of extreme pressure lubricants under the name of Lubrisol, with headquarters at Cleveland, and working with chlorinated stearic acid ester (Continental's modernized version of the Well & Southcombe (1920) patents calling for half a per cent. of fatty acid) and with the Dow development of the chlorinated diphenyl and diphenylene oxides.

An unexpected interest in the advantages that accrue to American chemical exporters by working under the Webb Pomerene Act has developed during the past year, and two associations have been organized under its provisions, Carbon Black Export, Inc., and the Naval Stores Export Association. The year's export business has been good in most chemical lines, notably so in fertilizer materials, chemical specialties, and coal-tar crudes. The figures for the full year are not yet available, but every quarter through the third showed a noteworthy advance in tonnages over 1934. The total for the twelve months will probably exceed a 20 per cent. increase. Imports of chemicals have also increased markedly, but not to the extent that have the sales abroad, say about 10 per cent. for the year.

Political considerations have not pressed so distressingly upon the industry as during the first two years of the present Administration. The Supreme Court's decision that the National Administration Act was unconstitutional brought real relief and no serious upset to most branches of the chemical industry. The blanket code of the industry, sponsored by the revived, and again moribund, Chemical Alliance, made no provision for the control of prices or of unfair trade practices; so that its suspension by the Court's decree created no upset in competitive conditions. The general revival of business activity, encouraged by the Supreme Court's checks upon the reformatory and regulatory measures of the New Deal and without doubt fed also by the vast sums which the Government has been putting into circulation, has naturally been reflected in chemical sales. There are still anticipatory fears of inflation, if the Government's expenditures are continued; but a growing confidence that come what may politically, the natural economic forces of a substantial revival cannot now be thwarted.





Above, new power house of Monsanto's main plant; and left, new chlorine plant unit in course of construction.

British Chemical Gains

By T. W. Jones

Editor, The Industrial Chemist, assisted by

N. W. Vere Jones

DISTINCT improvement in trade, which set in during the latter half of 1934, continued during the early months of 1935. There has been evidence of some hesitancy during later months and advances have been consolidated, rather than extended. Great Britain vis-a-vis the rest of the world has more than held her position. The above table (taken from the Federation of British Industries Business Barometer) indicates the comparative positions of the chief producing countries.

Within the recovery, chemicals hold their position and production has been maintained remarkably constant at the high level reached in the last quarter of 1934. Export and import figures for the first 10 months of this and last year taken from the Board of Trade returns are shown in the accompanying tables.

INDICES OF PRODUCTION (1928 = 100)

	U. K.	*France*	*Germany*	*U. S. A.*
1928	100	100	100	100
1932				
First Quarter	90.0	79.5	52.9	62.5
Second Quarter ..	89.4	74.0	54.3	54.7
Third Quarter ...	82.8	73.2	52.0	55.3
Fourth Quarter ..	90.0	76.1	56.9	59.5
1933				
First Quarter	89.9	80.8	54.7	56.5
Second Quarter ..	91.7	85.8	59.6	70.9
Third Quarter ...	91.8	87.4	63.1	82.6
Fourth Quarter ..	99.5	84.3	68.5	67.3
1934				
First Quarter	104.3	82.7	75.5	73.0
Second Quarter ...	103.4	79.5	80.6	76.3
Third Quarter ...	102.0	76.1	82.9	66.1
Fourth Quarter ..	110.5	73.7	84.6	69.7
1935				
First Quarter	111.7	73.2	87.7	80.5
Second Quarter ..	109.9	72.9	95.0	77.2
Third Quarter ...	109.0	73.2	95.2	77.5

EXPORTS OF MANUFACTURED CHEMICALS

Ten months ended 31st of October

	1934	1935	Increase or Decrease
TOTAL CHEMICALS	£16,273,824	£16,849,417	+ £575,593
Acids	319,829	324,253	+ 4,424
Aluminum Compds...	326,683	351,515	+ 24,832
Ammonium Compds.	1,486,102	1,310,449	— 175,653
Bleaching Powder ..	132,904	134,195	+ 1,291
Coal Tar Products ..	426,407	512,446	— 86,039
Copper Sulfate	515,952	432,480	— 83,472
Disinfectants and Insecticides	725,196	644,263	— 80,933
Glycerine	340,857	307,259	— 33,598
Sodium Compds. (except NaCl)	936,434	1,009,578	+ 73,144
Drugs	2,374,555	2,548,515	+ 173,959
Dyes	1,107,813	1,237,622	+ 129,809
Paints	2,348,914	2,594,484	+ 245,570
Soap	1,222,905	889,868	— 333,037
Rubber Tires	1,993,943	2,118,431	+ 124,488
Other Rubber Articles	1,460,452	1,448,154	— 18,298
Rayon Yarn and Tissue	1,558,050	1,513,290	— 55,240

Decreases in exports are chiefly in chemicals for agricultural use, fertilizers, insecticides and copper sulfate. The increase in drugs is largely accounted for by a 50 per cent. increase in the export of quinine, attributable to the malaria epidemic in Ceylon. Countries to which exports declined are: Canada, Netherlands, Belgium, Spain, Italy, China, Brazil, Argentine, and Japan. The largest decrease was to Japan, from £451,418 in 1934 to £316,444 this year, a fall of nearly 30 per cent.

Chemical imports showed a small increase this year against an increase last year of over £1,000,000. The main increases were in potassium compounds and drugs. Countries showing an increase include the Empire, Belgium, France, Italy, U. S. A., and Chile. Imports of dyes from Germany fell from £692,378 to £573,220. Japanese imports remained materially unchanged.

Economic nationalism continues unabated, but some amelioration has been effected by bilateral trade agreements and similar pacts. The Association of British Chemical Manufacturers was entrusted by the Board of Trade to work out negotiations with the Union of Polish Chemical Industries for an agreement which was signed in February whereby the duties on a long list of chemicals were either reduced or stabilized.

IMPORTS OF MANUFACTURED CHEMICALS

Ten months ended 31st of October

	1934	1935	Increase or Decrease
TOTAL CHEMICALS	£ 9,495,545	£9,790,069	+ £ 294,524
Acetic Acid	249,589	201,283	— 48,306
Citric Acid	35,304	47,543	+ 12,239
Tartaric Acid	157,347	120,251	— 37,096
Borax	90,456	74,766	— 15,690
Carbide	484,853	483,281	— 1,572
Potassium Compds...	1,119,331	1,248,034	+ 128,703
Drugs and Medicines	1,362,527	1,497,252	+ 134,725
Dyestuffs	1,079,490	937,308	— 142,182
Extracts for Tanning	800,877	793,950	— 6,927
Essential Oils	706,675	850,782	+ 144,107
Petroleum	12,960,159	15,242,759	+ 2,282,600
Soap	196,427	178,814	— 17,613
Paraffin Wax	830,301	691,818	— 138,483
Casein and Celluloid	1,117,468	1,081,905	— 35,563

This was followed up by a mission to make contacts with the various chemical organizations in Poland. Trade agreements have been signed with Italy, Turkey, Uruguay, Brazil and Roumania. The International Zinc Cartel was dissolved early in the year. The Ottawa Agreements are being critically surveyed by the Federation of British Industries; for while Inter-Imperial Trade has continued to increase, it appears that the Dominions have reaped greater benefits than this country. Imports of manufactured chemicals in

1935 from the Dominions show an increase, though in some cases, notably Canada, there has been a falling off in exports to them.

Increases have been made to the Import Duties Order, notably on ammonium salts and fertilizers, £4. per ton. Lead and zinc are new additions. Iodine, various intermediates, terpene containing essential oils, neutral gums and floral concretes have been added to the free list. Oxalic acid still receives exemption from the Key Industries Act, and the Budget saw a tax of 8d. per gallon added to hydrocarbons for motor car use and a 10 per cent. *ad valorem* duty on soya beans.

Prices of chemicals have remained fairly stable throughout the year, though tendencies were downward in the summer, while October showed a sharp advance all round. As usual, ammonium sulfate was very firm in the spring but weakened later in the year. Most coal-tar products weakened slightly during the year until the October spurt when nearly all prices, except pitch, were advanced. The prices of nearly all solvents have been reduced, carbon tetrachloride losing £4 per ton, amyl acetate and butyl alcohol about £5, though some of the loss was recovered in October. During the summer the price of glycerin was increased from £52. 10. 0. to £55. where it remains. Later in the year, lead salts in sympathy with the metal shot ahead, red lead being now £10. dearer than at the beginning of the year. Other base metals, with the exception of tin, show a similar, but less marked, tendency. Intermediates have remained steady throughout the year. Part, at least, of the jump in prices during October must be explained by the tense international situation.

The annual statements of almost all chemical firms reported increased profits during the year 1934/35. British Oxygen Co., with a record profit, shows an increase of nearly 100 per cent. In the first half year of 1935, 262 public and private companies were registered under the heading "Chemical" with a total capital of £2,340,578. Among the more important capital issues during the year in the chemical industry have been Unilever, £2,000,000; Gas Light & Coke, £2,500,000; British Oxygen Co., £1,250,000; Dunlop Rubber Co., £879,800; Macleans Ltd., £750,000; Ilford Ltd., £500,000; U. K. Gas Corporation, £500,000. Not only has the trading position of the chemical industry improved, but the considerable capital expansion places it in a position to make further and more rapid advances with improving trade conditions. The petition for a reduction of capital by I. C. I. from £95,000,000 to £89,565,859, involving a change in the ratio of exchange from deferred to ordinary shares, has been confirmed by the High Court.

At the time of going to press, it is too early to state what the results of the sanctions against Italy are likely to be. Exports of chemicals during the first ten months to Italy, fell from £192,118 in 1934 to £164,569 in 1935. They represent about 1 per cent. of the total of our exports of chemicals. Imports of chemicals from Italy during the same period increased from £199,136 to £206,209 or about 2 per cent. of the total import.

Production of sulfuric acid continued to expand during the spring, but has since received a set-back; some falling off however is normal following the spring activity in fertilizers. Decline in the contact process appears to have been reversed. Increased production is due to increased utilization of available plant rather than to new erections. About 72 per cent. of the available plant was in use in 1934 compared with 67.4 per cent. in 1933 and 74.8 per cent. for the first 6 months of 1935. By subjecting the gases to a water wash between the Gay-Lussac towers, Chance & Hunt have reduced considerably the loss of both sulfur and nitre. The Chief Alkali Inspector reports that the method of testing total acidity of escaping gases is unsatisfactory in that oxides of nitrogen are not wholly absorbed. A more effective method using alkaline H_2O_2 is described, and, if found satisfactory, will be adopted.

The use of sulfuric acid for spraying cereals to kill charlock and other weeds has increased fourfold. Experiments are being conducted for controlling potato "blight" by spraying the haulm with sulfuric acid before lifting.

1934 output of salt in Great Britain made a new high record at 2,506,000 tons, the previous record being as far back as the period 1873-1882 when the average annual output was 2,373,648 tons. Although two salt cake plants have closed down, the tonnage of salt decomposed increased by 4,875 tons last year. The percentage decomposed by the wet copper process increased from 7.9 per cent. to 11.7 per cent. A petition by the Cheshire United Salt Co. for a reduction of capital from £125,000 to £62,500 was confirmed by the Chancery Court.

Exports of caustic for the first 10 months more than made up for the set-back received last year:

1933	1934	1935
£974,139	£936,434	£1,009,578

The chief increase was to Japan whose purchases were nearly double. I. C. I. are enlarging their soda crystals plant at Crescent Wharf, London, and have tentatively secured a site near Port Adelaide, Australia, for a proposed alkali factory to exploit the salt and limestone deposits in the area.

Kemball Bishop & Co. are erecting a building for the manufacture of citric acid and lime citrate by the Pfizer fermentation process. I. C. I. are erecting a new plant for the production of oxalic acid at Widnes. A recent application of chlorine has been for slowing the rate of decomposition in sewage-beds. For handling chlorine, tellurium-lead pipes have been successfully employed, though frequently renewed mild steel or wrought iron pipes are still more generally preferred.

A process for detinning without the use of chlorine has been worked out. The tinplate is heated in a closed chamber with acetic acid vapor, a layer of water soluble tin acetate is formed and the iron base is not attacked. Production of magnesium light alloys continues to expand, and with heavy commitments for the Air Force should advance still further. A joint undertaking by I. C. I., British Aluminum Co., and Imperial

Smelting Corporation, under the name Imperial Magnesium Corporation, Ltd., is to develop the production of magnesium by the Kirsebom process.

A nitrate agreement was reached in July between Chile and the synthetic producers of this and other European countries. In the controlled market, the ratio between Chile and synthetic was maintained at 18:82. In the uncontrolled market, instead of outside markets being pooled, Chile receives a percentage of each, equivalent to 20 per cent. of the whole. This, with imports to the free American market, should result in an increase of Chile's total sales from 1,250,000 to 1,300,000 tons. The tendency of nitrogen production is brought out by the following table taken from the Bulletin of the Hamburg World Economic Archives.

1,000 tons N.	1928/29	1933/34
Total World Consumption	1,870	1,860
Total World Export	850	440
Exports from Chile	420	160
Exports from Germany	255	90–100

Although world consumption has remained constant, exports have fallen by half, indicating that previously importing countries are manufacturing their own synthetic nitrogen. This is particularly true of Italy who has doubled her production since 1932. The Cartel provides notice of termination at the end of two years, but it is hoped that during the period the export market will be stabilized. Japan remains outside; and although still mainly an importing country, she has repeatedly extended her export offensive.

Ammonium sulfate generally remains depressed. Fewer plants were operating in 1934 than in the previous years. Exports of ammonium compounds for the first ten months of the year stand at £1,310,449, a fall of £176,653 compared with the same period a year ago; those to Japan fell from £226,680 to £28,539. Imports of nitrate on the other hand increased from £58,540 to £80,011.

Fison, Packard & Prentice, Ltd., have increased their capital this year, part of which is required for the purchase of George Hadfield & Co.'s fertilizer factory in Liverpool, and part for financing the new Avonmouth factory where another American process Oberphos plant for the production of superphosphates is being erected. The grinding equipment, installed there by the Sturtevant Engineering Co., represents the largest order for such plant ever placed in this country. In conjunction with National Fertilizers, they have also acquired The Basic Slag & Phosphate Co. of Newport and Charles Norrington of Plymouth.

Stewarts & Lloyds Ltd. recently erected steel works contain an elaborate by-product recovery plant, including that for ammonium sulfate. The grinding and market of the whole output of basic slag in the same plant is in the hands of Corby Basic Slag, Ltd., a subsidiary of National Fertilizers Ltd.

The Billingham plant of the I. C. I. for the hydrogenation of bituminous coal was officially opened on October 15. A first shipment of 300,000 gallons was made in April; distribution is in the hands of Shell Mex, B.P., and the Anglo American companies. In addition to coal, creosote, petroleum and other oils may be, and are, used as raw materials, and the end products may be fuel or Diesel oil or intermediate fractions alternatively to petrol. The output is given as 150,000 tons per annum. The principal unit of the new plant of the Coal & Allied Industries, Ltd., is due to operate the end of the year, with a daily consumption of 500 tons of coal, to produce 4,000,000 gallons each of motor spirit and Diesel oil, and 100,000 tons of smokeless fuel. A duplicate plant is under construction. Low Temperature Carbonisation, Ltd., with the extension of their plant at Askern, now possesses the largest low temperature carbonization plant in the world. Annual coal consumption is of the same order as that at Billingham, and the estimated output is 500,000 gallons of crude petrol and 3,000,000 tons of crude coal oil, a large part of which will, as the result of a long term contract made with the I. C. I., be converted into petrol at the Billingham plant.

The National Coke & Oil Co. have perfected their experimental plant for the distillation of a mixture of coal fines and coal-oil. A new double unit plant at Tipton is now in operation. Other units are being, or about to be, erected at Erith, Trafford Park, Edinburgh and Glasgow. These plants are expected to produce 3,000,000 gallons of Diesel oil, rather more petrol, and 175,000 tons of smokeless fuel annually from 225,000 tons of coal fines. This is a representative though far from complete survey of the British development of oil production from coal. Similar plants are being erected in almost every country of the world.

Petrol containing alcohol is now familiar to all motorists in this country under the name of "Cleveland-Discol" marketed by the Distillers Company. There is the prospect of increased alcohol production since the price of molasses is now stabilized at the low figure of 1/3d. per cwt.; imports have been rising rapidly during the last few years.

Monthly averages of Imports of Molasses	1932	1933	1934	1935 First 8 months
Cwts.	388,842	396,121	546,553	701,675

A large molasses fermentation plant at Bromborough Port, to a total value of over $1,250,000, is being carried out by Commercial Solvents Corporation in conjunction with the Barter Trading Corp.

In Austria, France, Germany, Hungary, Italy, Czechoslovakia, Latvia and Sweden, alcohol is now a compulsory admixture to gasoline. The "economics" of this policy is exemplified in France. The c. i. f. value of imported first grade petrol is about $25 a ton, the Alcohol Monopoly buys alcohol from the manufacturers at $195 a ton and resells it to the distributors at $100-$130 a ton according to the fuel with which it is to be mixed. This year the French State is expected to lose $25,000,000 on resale of alcohol.

Two important advances in processing lubricating oil have been recorded during the year. The Clearsol process, employed by the Vacuum Oil Co., removes readily oxidizable constituents by a solvent extraction process. The solvents used are propane and cresylic

acid, and the process is carried out under high pressure. The Duo-Sol process operated by Herbert Greene & Co. also depends on solvent extraction. With two immiscible solvents the asphaltic and paraffinic constituents of the oil can be separated by counter-current washing. By its means, lubricating oils can be prepared to meet the exacting demands of the Royal Air Force which has heretofore obtained them from Russia. The same firm is also operating, under license from the Texaco Co., a process for dewaxing lubricating oils.

The Empire remains easily the best customer for British dyes, and of the total, excluding alizarine, India takes 21 per cent., Australia 17 per cent., and other British countries 16 per cent., the next best customer being China with 6 per cent. British production of acetate rayon dyes and of vat dyes appears to be lagging behind requirements, as large quantities of both are still imported even though British production of the former increased last year by more than 50 per cent. over the average production 1929/1933. Imports of vat dyes from the Continent were 2,109,560 lbs. in 1934 compared with 1,662,707 lbs. in the previous year.

A new technique for dyeing wool has been worked out by the I. C. I. Previously wool has been dyed at the boil and this is detrimental to the fibre. The new process consists in dyeing with turbulence by bubbling compressed air into the dye bath; by this means dyeing can be effected at temperatures of 60-80° C. Moreover, the dyeing takes place more rapidly, and with thick fabrics, such as wool-felt, more thoroughly. Attaching the fabrics to an electrical vibration machine also improves the dyeing.

The most interesting addition to new British dyes this year is Monastral Fast Blue B.S., the first discovery of a blue pigment for over 100 years. Moreover, being fast to both acid and alkali, it has advantages over ultramarine and Prussian blue. It is the nearest approach to a true trichromatic blue yet produced and should find application in three color printing as it supplies a true "minus red" pigment, in distempers as it is fast to the alkaline reaction of lime, and its inertness, texture, oil absorption and ease of wetting render it particularly suitable for paints and lacquers.

Our hopes expressed last year for greater artistic merit in the design of plastics have been fulfilled, perhaps the most striking example being the plastics display at the Royal Academy Exhibition of British Art in Industry early in 1935. The dimensions to which the industry has grown were evidenced at the British Industries Fair where over thirty firms exhibited. Agreement has been reached between I. C. I. and Toledo Synthetic Products, for interchange of technical and commercial information and patent licenses. The agreement refers to molding and laminated compounds from urea formaldehyde or urea thiourea formaldehyde resins. In conjunction with Mouldrite Ltd., I. C. I. exhibited this year a transparent plastic known as "M" resin. I. C. I. are also extending their factory at Stowmarket, Suffolk, to increase the manufacturing capacity of Nobel Chemical Finishes chiefly in the field of synthetic paints and nitrocellulose paints.

Raw materials for synthetic resins continue to increase. Considerable attention has been paid to cracked petroleum distillates, the various processes described being essentially the imitation of pitch formation under controlled conditions. Both aliphatic diolefines and cyclic compounds have been condensed with inorganic acids and benzene sulfuric acid. Other aromatic hydrocarbons and terpenes have been successfully condensed with formaldehyde. Considerable research has been devoted to the production of plastics from ketones; both acetone and cyclohexanone are likely to yield important industrial development in the future. Sugar, refined and as molasses, is used for the more expensive formaldehyde in the production of phenolic resins. "Sucrolite" is the best known example. A transparent plastic for replacing glass is foreshadowed; it is a condensation of sucrose and formaldehyde with urea.

Plastics as a constructional material for the chemical engineer continues to develop; a considerable increase in tensile strength is attained by lamination and this has made possible the use of resin for bolts, nuts, gears, etc. Kestner Evaporator & Engineering Co. have considerably enlarged their range of "Keebush" products; a laminated resin, pipes of standard sizes and with the same fittings as ordinary mild steel pipes are now available.

Interesting electrical welding appeared during the year, Herbert Greene & Co. having installed a fractionating tower in one piece. It is 60 ft. high, 9 ft. 6 in. in diameter and weighs 53 tons. A new electric induction furnace known as the "Russ" has been introduced for aluminum and other light alloys. Possessed of all the advantages of an induction furnace, it is claimed that the only part requiring renewal is the lining and this should be capable of withstanding a thousand melts. The new gas scrubbers designed by the I. C. I., using a suspension of lime of chalk, have reduced the sulfur in the flue gases at the Battersea Power Station to 0.01 grains per cu. ft.

A new protective coating for chemical works is Detel, marketed by Detel Ltd., made in a variety of grades, clear or colored. It is not absorbed by a porous surface such as cement and is unaffected by lime. The white undercoating can be applied to a wet surface, the moisture drying out through it. The zinc undercoating is in electrical contact with the metal to which it is applied and gives true anodic protection. A new self-hardening acid resisting cement is supplied by J. M. Steel & Co., under the name"Asplit." It is resistant to HCl, H_2SO_4 (50 per cent.) organic acids and steam up to 355° F.

The "methanol-soda" process for removing traces of CS_2 from benzene, etc., gives good results. It consists in treating benzol in the usual washer with methyl alcohol and caustic soda, when the CS_2 is removed as sodium methyl xanthate. Addition of water causes separation of the benzol and aqueous solution containing the xanthate can be run off.

Chemical Chronology, 1935

January Du Pont opens Haskell Laboratory of Industrial Toxicology. ¶ Cyanamid organizes Canadian subsidiary, North American Cyanamid, Ltd. ¶ N. J. Zinc Sales purchases David Randall & Co., Boston broker of raw materials. ¶ Secret Chemical Industries' ballot of 657 companies: 328 to abolish NRA; 252 to modify; and 77 to continue. ¶ E. H. Hooker assails New Deal utilities program at N. Y. State Chamber of Commerce Dinner. ¶ George O. Curme (Carbide) is Perkin Medalist. ¶ Lewis W. Douglas becomes a Cyanamid V.-P. ¶ Kitchel is new Binney & Smith president. ¶ At testimonial dinner, Dr. Chas. H. Herty pleads for use of Southern-made fertilizer. ¶ Du Pont announces "Nitramon," a new explosive with revolutionary improvements. ¶ Goodrich markets "Koroseal"—new rubber plastic. ¶ M. C. A. adopts a standard carboy. ¶ Resinox doubles plant capacity, and Givaudan-Delawanna plans new factory. ¶ Carus introduces several new permanganate salts. ¶ Commercial Solvents buys into molasses companies. ¶ Shellac market breaks as London pool collapses. ¶ Chemical stocks rise as general list declines. ¶ Freeport Texas reduces quarterly dividend to 25c from 50c. ¶ Dow privately finances $3,600,000 notes. ¶ Number of oils reach new 3-year highs. ¶ Deaths: Col. William Spruance, 62, du Pont, V.-P.; John T. Baker, 74, board chairman, J. T. Baker Chemical; George Keville Davis, publisher, British *Chemical Trade Journal.*

February E. H. Hooker, Col. Riley testify in Washington for the industry on the Security and 30-hour Bills. ¶ Allen, Lammot du Pont and Merck represent M. C. A. in plans for A. C. S. meeting to commemorate 300th anniversary of the founding of American chemical industry. ¶ Carbon Black Export Inc., formed. ¶ Father Nieuwland and Dr. Carl D. Anderson medalists of the American Institute. ¶ Dr. Charles A. Kraus, Willard Gibbs medalist. ¶ Mallinckrodt's Wasserscheid elected president, N. Y. Drug & Chemical Club. ¶ Court of Customs & Appeals rules Soviet apatite, made by U. S. patented process, importable duty free. ¶ Calumet & Hecla's MacNaughton receives medal of the American Institute of Mining and Metallurgical Engineers. ¶ Southern Phosphate charges infringement by Phosphate Recovery on process for concentrating oxidized ores. ¶ Harold Urey receives Nobel Chemistry Prize. ¶ Westvaco announces major plant improvements. ¶ Mathieson ships from Lake Charles' plant and opens Houston office. ¶ Oils advance to new highs. ¶ Tin price falls. ¶ Du Pont statement shows 20% gain in net profits over '33. ¶ Trade agreement between U. S. and Brazil signed, and manganese producers protest. ¶ Value of chemical stocks again rises, while the general list goes lower. ¶ Deaths: Frederick W. Braun, 76, pioneer West Coast jobber; M. C. Hill, 32, partner, Hill Bros. Chemical, Los Angeles; Dr. Charles H. Peep, 42, Rohm & Haas research director.

March Monsanto takes over Swann. ¶ Railroads win higher rates from I. C. C. with several chemicals affected. ¶ Du Pont rayon plant in the Argentine. ¶ Curtis R. Burnett, new president, American Oil & Supply. ¶ John W. McCoy, general manager, du Pont's explosive dept., elected a director. ¶ Carbide's $10,000,000 plant at Whiting, Ind., in production. ¶ Monsanto acquires Atlantic Chemical. ¶ First quarter chemical exports up 28%—imports increased 11%. ¶ James Critchett (Union Carbide) heads Electrochemical Society. ¶ "Huey" Long and the Townsend "Plan" are attacked by Senator Robinson before 1,500 at N. Y. Drug & Chemical Section dinner of Board of Trade. ¶ Alcohol raised 1½c and xylol, 4c. ¶ Ober, old fertilizer firm, taken over by Davison Chemical. ¶ Monsanto '34 sales 14% ahead of '33 and greatest in company's history. ¶ Carbide reports $2.25 a share for '34 as against $1.57. ¶ Rudolph G. Sonneborn heads Oil Trades Association. ¶ Liquid copper paint announced by National Copper Paint. ¶ Deaths: Dr. Carl Duisberg, 73, leading German chemical industrialist; David A. Kemper, 45, activated carbon expert; George L. Harrison, 99, retired chemical manufacturer, a grandson of John Harrison.

April 300th anniversary American chemical industry celebrated by largest A. C. S. meeting ever held. ¶ Publication "Supplement, Chemical Industry's Contribution to the Nation" by Chemical Industries. ¶ Father Nieuwland, Nichols Medalist. ¶ Dr. Walter J. P. Podbielniak presents revolutionary paper on distillation. ¶ Solvay opens new Baton Rouge alkali plant. ¶ James T. Pardee succeeds late A. E. Convers as Dow board chairman. ¶ F. Austin Lidbury receives Schoellkopf Medal. ¶ Du Pont acquires Acetol Products. ¶ Isco builds new caustic addition. ¶ Westvaco takes over E. C. Klipstein plant at South Charleston. ¶ Merck's plant at Falls of Schuylkill destroyed by fire. ¶ Carbide to enlarge Charleston plant June 1. ¶ V.-C. directors appeal order to pay dividend on prior preference stock. ¶ Acetic and other chemicals higher, result of higher freight rates. ¶ Speculation drives silver salts higher. ¶ Stocks of xylol, toluol and solvent scarce. ¶ Monsanto introduces "Santophen" reinforcing agent for coal tar disinfectants. ¶ Fertilizer sales about 10% ahead of '34. ¶ Chemical stocks advance in general market upturn. ¶ Rolls Chemical celebrates 20th anniversary. ¶ Deaths: A. E. Convers, 76, Dow board chairman; Alfred I. du Pont, 70; Dr. Ernst Bischoff, 71; Charles H. Dempwolf, 85, founder of York Chemical; Edgar Field Price, 62, former Carbide director; Charles W. Hill, 66, well-known Pacific Coast chemical dealer.

May NRA declared unconstitutional by the Supreme Court. ¶ Wishnick-Tumpeer opens London office, Witco, Ltd. ¶ Allied's head, Orlando Weber, resigns and H. F. Atherton becomes chairman. ¶ General Chemical wins rehearing on sulfuric catalyst patent suit against Standard Wholesale Phosphate & Acid. ¶ National Carbon victor in Chaney patent suit on activated carbon. ¶ "Chem. Engineers" meet in Wilmington and Institute of Chemists in Atlantic City. ¶ United Carbon organizes production subsidiary, United Carbon, Inc. ¶ Krebs introduces 3 new pigments. ¶ U. S. I. introduces amyl propionate. ¶ E. J. dePree named St. Louis plant manager for Monsanto. ¶ Cartel formed by international potash producers. ¶ Dr. J. W. Turrentine heads newly formed American Potash Institute. ¶ Dow and Cleveland-Cliffs form Cliffs-Dow Chemical. ¶ Penn Salt declares special $1 distribution. ¶ Deaths: Robert W. Griffith, 55, Champion Fibre; William C. Mitchell, 42, Ciba; Thomas C. Meadows, 64, an organizer of the I. A. C.

June Farm Chemurgic Council, Francis P. Garvan, chairman, formed. ¶ Important alkali freight rate changes approved to go into effect Sept. 1. ¶ Leather chemists meet at Skytop. ¶ Great Western Electro-Chemical 5 for 1 stock split-up. ¶ Arabol Mfg. (adhesives) celebrates 50th anniversary. ¶ Irving Langmuir recipient Holley Medal. ¶ C. W. Nichols resigns Nichols Copper presidency. ¶ Borax and boric acid prices advance sharply, 1st in several years. ¶ Texas Gulf option on the Leviathan sulfur property. ¶ Allen E. Rogers opens a private formula company. ¶ Paramet successfully defends resin patent suit started by G. E. ¶ Vitro sues Ceramic Color & Chemical, alleging patent infringement. ¶ Glidden wins suit of the Government to collect alcohol taxes. ¶ Melvin

elected president, National Fertilizer Association. ¶ Reorganization plan for Davison Chemical announced. ¶ General business conditions improve. ¶ Monsanto calls for retirement 5½% '42 bonds and plans redemption of outstanding stock of 3 former Swann subsidiary companies. ¶ "Nevinol"—a new plasticizer by the Neville Co. ¶ Deaths: Morris Trubek, 69, founder of Franco-American Chemical; John W. O'Brien, 56, general superintendent of operations for Grasselli; Gilbert F. Oliver, a former Ault & Wiborg V.-P.; William Langstaff, Sr., 71, former Grasselli superintendent, Grasselli, N. J.

July George Truxal, former chemical dept., Cleveland-Cliffs, opens dealer's business Cleveland. ¶ Emery Industries purchases Duratone, maker of laundry soaps. ¶ Natural salt cake producers seek $5.50 duty. ¶ Manganese producers protest concessions made by Sec. Hull in Soviet trade treaty. ¶ Dr. Everett P. Partridge, Bureau of Mines, joins Hall Laboratories. ¶ Catalin wins cast phenolic resin patent suit (Kienle patent) against Catalazuli. ¶ Revised potash schedule released, 5c a unit higher, but with old discounts again in force. ¶ Government through the AAA lifts all restrictions on naval stores, makes no more loans and market falters. ¶ Chinawood oil starts spectacular price rise. ¶ Fraser M. Moffat, Jr., elected a V.-P. of U. S. I. Chemical. ¶ F. W. Pickard, a du Pont V.-P., retires after 35 years' service. ¶ Deaths: Harold W. Simpkins, 50, Mallinckrodt treasurer; J. W. Block, 68, founder, Blockson Chemical.

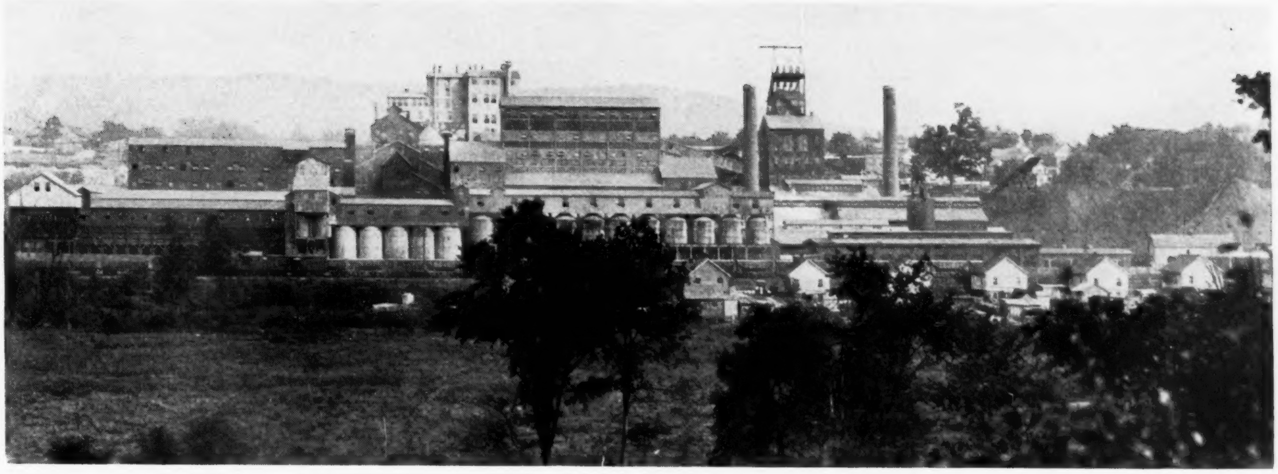
August United Chromium wins patent suit against G. M. C., New Departure Manufacturing Co., and Bassick. ¶ Agricultural Insecticide group rewrites by-laws. ¶ Arthur D. Little's will discloses M. I. T. chief beneficiary. ¶ Brown Co. in receivers' hands. ¶ James A. Webb & Son, now a U. S. I. subsidiary, celebrates diamond jubilee. ¶ Pennsylvania Coal Products offers color stabilizers and anti-oxidants for rubber. ¶ Du Pont's dye works wins safety medal. ¶ Carbide plans additions to Charleston Vinylite plant. ¶ Interstate motor traffic comes under I. C. C. ¶ Arthur E. Wells heads Beetleware division, Cyanamid, while Childs, former head, to Lederle division. ¶ A. C. S. holds 90th meeting, San Francisco. ¶ Scarcity of glycerine stocks. ¶ Naval stores prices right themselves. ¶ Cyanamid, with privately borrowed funds, pays all funded debt. ¶ Westvaco calls in 5½% debentures. ¶ Du Pont declares 35c extra. ¶ Chemical shipments in August are heavy. ¶ Dr. William A. Noyes presented Priestley Medal while Dr. Raymond M. Fuoss receives A. C. S. award for outstanding research in pure chemistry. ¶ Deaths: Henry Hunter Smith Handy, 79, well-known chemical industrialist.

September Natural and synthetic nitrogen producers conclude 3-year pact. ¶ Wood naval stores producers form an export association. ¶ P. & G. and Colgate fail in suit against Lever Bros., a bitterly fought war over patents on granulated soap. ¶ President ends tariff concessions to Germany. ¶ President approves findings on synthetic camphor tariff rate and no change is made. ¶ Toledo Synthetic Products negotiates important tie-up with I. C. I. and Montecatini. ¶ Du Pont sponsors educational radio program. ¶ Alfred A. Corey, Jr., resigns presidency of Vanadium. ¶ Dr. Wallace H. Carothers, du Pont, sails to address Faraday Society. ¶ National Fertilizer Association formulates plan to work under a voluntary NRA. ¶ Compensatory taxes on various oils become effective. ¶ Joseph Turner & Co. announces a 98% calcined carbonate of potash. ¶ Solvay opens Houston office. ¶ Alcohol producers employ new consignment marketing plan for anti-freeze business. ¶ Paint and other consuming industries consuming tung oil alarmed at soaring prices, seek substitutes. ¶ Air Reduction declares $1.50 extra. ¶ Dow's Dr. John A. Gann celebrates 15th anniversary working on Dowmetal. ¶ Deaths: Dr. Leo Gans, 92, famous German chemical industrialist of an earlier day; Thomas J. Maxwell, 73, Tennessee Extract secretary-treasurer; William Hutton Blauvelt, former Semet-Solvay general manager.

October I. C. I.'s Billingham hydrogenation plant is dedicated. ¶ Dr. Edward R. Weidlein receives the Chemical Industry Medal. ¶ Swain is a new Electro-Metallurgical V.-P. ¶ Per K. Frolich is now chief chemist, Standard Oil Development. ¶ Some details of Solvay's new process for making chlorine and sodium nitrate revealed. ¶ Columbia Alkali announces construction of a chlorine plant. ¶ Terrific explosion wrecks solvent recovery plant of Glidden's soybean oil plant. ¶ Du Pont completes construction of enlarged "DuPrene" (synthetic rubber) plant, Deepwater, N. J. ¶ Dr. Otto P. Amend made honorary member, American Institute of Chemists. ¶ Empire Distilling buys old Syrup Products' Yonkers distillery. ¶ Chaplin Tyler becomes assistant director of publicity, du Pont. ¶ Direct application of ammonia to soil reported. ¶ Stock market stages old-fashioned "Bull Market" rally. ¶ Deaths: Eugene R. Grasselli, 63, former Grasselli V.-P.; Charles H. Mapes, 68, prominent in fertilizer field; Dr. Hans Tropsch, 46, coal and petroleum expert in Germany. ¶ Frank J. Tone receives Acheson Medal, Electro-Chemical Society.

November Bell, Alliance head and industry's spokesman, reports chemical manufacturers 96% against a revived, modified NRA, answering Co-ordinator Berry's plea for industry representation at proposed Washington conference. ¶ Dr. Benjamin T. Brooks and American Petroleum Institute's Byles in disagreement over petroleum reserves. ¶ Colgate's Dr. Martin H. Ittner chosen to head chemical engineers in '36. ¶ Directors and officers of Chemical Alliance re-elected. ¶ William B. Bell chosen head of the Republican finance committee for '36 presidential election. ¶ C. F. Burgess, after 25 years of service, elected board chairman, Burgess Laboratories. ¶ Aromatic Products formed. ¶ Catalin wins again against Catalazuli before U. S. Circuit Court of Appeals. ¶ United Carbon announces increased production capacity. ¶ Catalin forms fabricating unit. ¶ U. S. signs new tariff trade pact with Canada. ¶ C. W. Nichols criticizes Allied management as "reactionary." ¶ 400 attend National Fertilizer convention at Atlanta and approve plan for self-government. ¶ Du Pont produces crystal urea (1st time in this country). ¶ Bitter battle waging for control of V.-C. ¶ Du Pont declares special G. M. stock dividend. ¶ Users of specially denatured formulas aroused over use of patented denaturing chemicals. ¶ Deaths: Joseph Turner, 67, well-known chemical merchant; C. T. Melvin, 53, N. F. A. president, suddenly on eve of the Atlanta convention; Joseph T. Lea, Sr., 59, president, E. M. Sergeant Pulp & Chemical.

December Most successful Chemical Exposition in years. ¶ Insecticide & Disinfectant makers elect William B. Eddy, Rochester Germicide, president. ¶ August Merz re-elected president, S. O. C. M. A. ¶ Earle W. McMullen new Eagle-Picher Lead research director. ¶ Co-ordinator Berry's industrial conference almost ends in fist fight. ¶ Phosphate rock prices weaken. ¶ Du Pont receives "*Chem. & Met.*" Award. ¶ Air Reduction proposes 3 for 1 split-up. ¶ Celluloid-Libbey-Owens Glass patent controversy over laminated glass ordered to trial. ¶ October chemical exports reach new high for several years past. ¶ Merck stockholders approve reduction in dividend rate of 8% accumulative preferred. ¶ Potash Co. of America completes new refinery. ¶ Hercules stockholders approve change of rate on preferred from 7% to 6%. ¶ Attempts to form a naval stores agreement fail. ¶ Deaths: Edmund Kingsley Baker, 80, former treasurer, Hampden Paint & Color; Dr. Lafayette B. Mendel, 63, Yale University; George William Fortmeyer, 97, former National Lead director.



The Franklin, N. J., mine of The New Jersey Zinc Co.

Zinc as a Chemical Raw Material
Part I

By Bruce R. Silver

Manager, Technical Service, The New Jersey Zinc Co.

UNTIL quite recently, zinc was known commercially as "spelter," and its largest use is still termed "galvanizing." Hence, the importance of this non-ferrous metal in our economic order has been obscured for it has not been universally known and recognized by its proper name.

The world production of both copper and lead has always exceeded zinc, but in 1934 the tonnages of the three metals approached equality.

World Production 1934
(Short Tons 2000 lbs.)

Copper	*Lead*	*Zinc*
1,381,929	1,338,100	1,301,595

(Source—Year Book of the American Bureau of Metal Statistics)

These tonnage figures misrepresent the true relative use of the metals. If equivalent volumes are the basis of comparison, zinc is the most extensively used non-ferrous metal. If the rather considerable tonnages of zinc pigments and salts are added to the slab metal figures, either on the basis of actual production or on the zinc content, then the assertion becomes even more valid.

Zinc was probably not known in ancient times. The metal was probably first produced in China several centuries before the first recorded shipments to Europe, which were made during the sixteenth century. There is also some evidence that zinc was smelted in India in early times.

Prior to Augustus Caesar, the zinc found in Roman coins was present as an impurity. Subsequently it appeared as a deliberate addition. Although they did not know the alloying constituent, the Romans were the inventors of brass. They melted copper with calamine (natural zinc carbonate) and obtained a yellow alloy of a more golden color than bronze, which they called "calamine brass."[1] Paracelsus (1493-1541) is usually credited with the identification of zinc as a metal, but it seems quite probable that Agricola[2] discovered it sometime previously.

Zinc was first imported into Europe from China by the Portuguese and Dutch, who called the metal "spiauter" or "spialter," from which Boyle derived "speltrum," which survives today as "spelter," especially in the United Kingdom. In the United States, due largely to the activities of the American Zinc Institute, the use of the designation "spelter" is rapidly disappearing.

The evidence is clear that the first commercial production of zinc in Europe was in Bristol, England, about 1740 by John Champion, who may be regarded as the founder of the industry. It is less definitely known that the Bristol process was the result of Dr. Isaac Lawson's visit to China for the specific purpose of learning the details of the method of extraction there. The English type of furnace, however, was not a commercial success.

Abbé Dony of Liege, Belgium, independently discovered a smelting process for zinc from calamine ore, and by 1807 this process was on a commercial scale. The well known Societe de la Vielle Montagne, still an important factor in the industry, was organized in 1837 to carry on the operations established by Dony and his successor Mosselmann. The production of zinc

in Germany and Poland was also established in the early years of the nineteenth century.

The first zinc made in America was produced about 1838 at the Government Arsenal in Washington, by Belgian workmen brought to this country to manufacture the zinc for the first set of brass standard weights and measures. The metal was made from the red zinc ore (zincite) from the Franklin, N. J., mine. The first commercial attempt to smelt zinc in the United States was made by The New Jersey Zinc Co. in 1848 at Newark, where a furnace of the English type was erected. The operation was not commercially successful and was abandoned after a short time because it was practical to make zinc oxide from the Franklin ores. In 1859, a successful retort plant of the Belgian type was erected at Bethlehem, Pa., which was later acquired by The New Jersey Zinc Company.

Prior to 1909, when the United States took first place, Germany was the leading producer of metallic zinc. Belgium was second, until displaced by the United States in 1901, and continued in third place until the demoralization of the industry at the outbreak of the World War. By 1934, with the loss of Silesia and Upper Silesia, Germany had dropped to sixth place in the world production, Belgium occupied second place while Canada, Great Britain and Poland had become important producers in the order named.

Probably the first use of zinc was in the manufacture of brass, but this application of the metal met opposition from the calamine-brass makers who claimed that the metal produced an inferior alloy. Abbé Dony had built a rolling mill and was producing sheet zinc by 1812. Galvanizing was invented by Cranford in 1837. Zinc oxide was manufactured in France on a commercial scale in 1841, following pioneer work by Sorel and LeClaire. Development, however, was slow, due to the failure fully to appreciate the properties of the metal. In 1840, production had reached a total of only slightly more than 17,000 tons.

The ores of zinc, which are widely distributed and often associated with lead, copper and silver ores, may be classified as follows: Zinc Sulphide (Zinc Blend, Sphalerite), Zinc Carbonate (Calamine, Smithsonite), Zinc Oxide (Zincite), Zinc Silicate (Willemite), Iron, Zinc, Manganese Oxide (Franklinite).

"Zincite," "Willemite" and "Franklinite" are found in commercial quantities only in Franklin, Sussex County, N. J.

In the United States, production of metallic zinc and zinc pigments and salts closely parallels ore production. This is not true in other parts of the world. For example, Mexico produced in 1934 249,748 metric tons of zinc ore containing an estimated recoverable zinc content of 112,400 metric tons, but actually produced only 36,609 metric tons of metallic zinc. Australia produced in 1934 203,239 metric tons of ore with an estimated recoverable zinc content of 81,300 metric tons, but produced 53,845 tons of metallic zinc. According to the American Bureau of Metal Statistics, the production of zinc ore in the United States by districts for 1934, with the estimated recoverable zinc in tons of 2,000 pounds, dry weight, was as follows:

	Concentrates	*Zinc*
Tri-State (Mo., Kans., Okla.)	316,400	158,200
Wisconsin	20,000	10,000
Rocky Mountain	246,100	113,900
Appalachian region (N. Y., Va., Tenn.)	116,000	58,000
New Jersey	364,700	72,900

Except for Wisconsin, which has registered a decline in the production of zinc ore since 1920, the proportionate

Table 1—World Production of Zinc

According to the American Bureau of Metal Statistics, in short tons of 2000 lbs.

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924
Australia	5,038	5,151	5,318	4,032	10,023	9,128	10,825	1,883	26,447	46,091	52,205
Austria-Hungary .	16,640	10,469	12,783	13,885	13,224	......	......	......	......	......	......
Belgium	160,809	56,929	25,269	11,340	10,188	21,886	92,880	72,917	124,710	162,082	178,242
Canada	......	......	2,973	9,982	12,571	12,323	18,508	26,494	27,782	30,025	27,443
France	46,805	21,136	22,324	25,268	20,218	11,902	21,659	33,069	41,887	54,381	63,614
Germany	260,072	204,263	196,173	205,523	189,434	93,670	107,406	99,207	116,293	35,467	45,745
Great Britain	55,982	57,772	57,997	57,214	42,979	42,126	27,550	6,515	20,525	35,033	43,098
Italy	......	......	284	404	1,299	1,413	1,297	427	2,901	4,060	6,569
Japan	6,518	23,293	42,970	60,299	43,979	21,837	17,356	11,435	11,023	15,190	15,508
Jugo-Slavia and Czechoslovakia .	......	......	......	......	......	4,419	6,612	6,614	9,921	4,564	9,946
Mexico	......	......	......	......	......	......	......	......	......	......	......
Netherlands	18,230	12,265	13,335	4,473	750	......	2,238	7,060	14,327	18,126	20,051
Norway	1,876	2,176	2,019	1,931	2,044	3,731	2,024	2,205	2,039	4,170	5,538
Poland	10,488	6,039	8,234	9,184	5,392	4,868	5,909	7,745	10,141	105,971	102,614
Rhodesia	......	......	......	......	......	......	......	......	......	......	......
Spain	9,676	7,055	7,163	8,265	11,020	11,031	6,469	6,614	5,512	12,039	14,084
Sweden	2,535	9,477	11,020	8,816	4,753	2,648	6,458	3,858	2,094	......	......
United States ...	370,200	507,004	679,833	682,225	525,217	471,556	479,772	215,614	373,678	531,202	535,846
Others	......	......	......	......	......	......	......	......	......	1,420	4,685
Total	964,869	923,029	1,087,695	1,102,841	893,091	712,538	806,963	501,657	789,284	1,059,821	1,125,188

contribution of the several districts over the past ten years has been fairly constant.

Until 1930, when The New Jersey Zinc Company introduced the continuous vertical retort process, there had been practically no change in the pyrometallurgy of zinc since the Belgian process of Dony. The electrolytic recovery of zinc was described in 1862 by J. Dickson, but the process was not a commercial success until about 1916 when the Anaconda Company started a substantial production in Montana.

In the pyrometallurgy of zinc, two steps are ordinarily required:

(1) Roasting the ores to reduce the sulfur content.
(2) Reduction of the calcined ores to metallic zinc by carbon (anthracite coal).

With the oxidized ores (Willemite, Zincite), the first operation is unnecessary.

In the electrolytic process, the following steps are essential:

(1) Solution of the zinc ores in sulfuric acid.
(2) Careful purification of the zinc solution, as practically every heavy metal impurity normally present interferes with electrical efficiency.
(3) Electrolysis carried out with lead anodes and aluminum cathodes.
(4) The zinc is stripped from the cathodes and melted into ingot form.

Production of Metallic Zinc

World production of metallic zinc, in tons of 2,000 pounds, for the period 1914 to 1934, is shown in Table 1.

The estimated use of metallic zinc in 1934 in the United States in tons of 2,000 pounds is given in Table 2.

Table 2

Galvanizing		152,000
Sheets	83,300	
Tubes	22,000	
Wire	20,000	
Wire Cloth	4,000	
Shapes	22,700	
Brass Making		98,000
Rolled Zinc		40,900
Die Castings		32,000
Other Purposes[3]		37,000
		359,900

[Source, American Bureau of Metal Statistics]

Except for the phenomenal increase since 1926 in the use for die castings, when this use was first separately estimated, there has been little change in the proportionate use of metallic zinc in the past ten years. The use in die castings increased from 2 per cent. of the total in 1926 to approximately 9 per cent. in 1934.

The peak output of metallic zinc was in 1929 with 1,620,898 tons of which the U. S. contributed 631,601 tons. During that year, the world consumption was estimated at 1,611,673 tons of which the U. S. used 595,234 tons. In the U. S., the highest per capita consumption was 10.03 pounds in 1926. In 1932, it had dropped to 3.41 pounds; in 1934, it had recovered to 5.60 pounds.

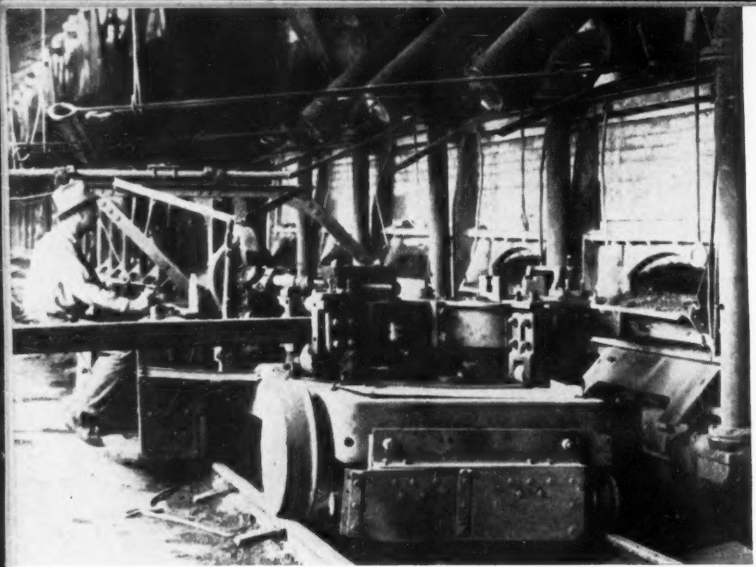
Slab Zinc Specifications

The specifications for slab zinc adopted by the American Society for Testing Materials are given below. The British Engineering Standards Association recognizes 3 grades which follow the corresponding American grades fairly closely. The Federal Specifications also parallel A.S.T.M. grades.

Table 1—World Production of Zinc—*Con.*

	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Australia	51,280	52,942	54,438	55,010	56,001	61,397	59,996	59,144	60,425	†
Austria-Hungary	......	......	......	......	......	......	......	......	......	......
Belgium	188,339	208,078	219,457	227,404	218,145	194,258	148,502	106,185	151,449	192,885
Canada	38,481	61,727	73,528	81,765	86,049	121,467	118,564	86,152	91,229	134,926
France	74,693	80,969	92,161	106,783	100,984	100,030	69,353	54,376	61,217	56,465
Germany	64,620	75,361	92,706	108,136	112,435	107,254	49,934	46,276	55,819	80,316
Great Britain	42,726	20,148	46,893	62,043	65,294	54,427	23,790	30,101	45,987	116,675
Italy	7,141	8,417	8,121	11,744	17,421	21,235	18,643	19,345	24,504	26,908
Japan	18,684	18,708	19,288	21,086	21,807	24,669	24,504	27,337	32,537	‡
Jugo-Slavia and Czecho-slovakia	5,767	5,693	8,932	13,865	20,665	22,265	14,169	9,728	10,849	‡
Mexico	1,406	6,550	7,089	12,368	29,954	41,066	38,854	33,454	30,712	40,354
Netherlands	23,277	27,333	28,955	29,635	28,342	25,634	21,290	17,222	20,368	21,952
Norway	7,503	5,907	6,049	......	6,080	38,152	43,510	43,401	49,509	‡
Poland	126,038	136,393	165,755	178,269	186,324	192,598	143,960	93,640	86,249	101,598
Rhodesia	......	......	......	10,730	13,575	20,055	7,696	......	20,767	21,882
Spain	16,669	17,707	18,222	14,935	13,035	11,790	11,114	10,475	9,421	9,016
Sweden	......	......	......	......	......	......	......	......	......	......
United States	590,928	638,533	613,548	619,595	631,601	504,463	300,738	213,531	324,705	366,637
Others	8,162	8,746	8,949	13,551	13,186	9,434	13,331	23,439	27,723	125,000
Total	1,265,714	1,373,212	1,464,091	1,566,919	1,620,898	1,554,742	1,107,948	873,806	1,103,468	1,294,614

† Included with Great Britain; ‡ Included with "others."



The Wetherell grate furnaces for the manufacture of American process zinc oxide.

	Special High Grade	High Grade	Intermediate
Lead, not more than	0.01%	0.07%	0.20%
Iron, not more than	0.005	0.03	0.03
Cadmium, not more than	0.005	0.07	0.50
Total Lead, Iron and Cadmium, not more than	0.01	0.10	0.50

	Brass Special	Selected	Prime Western
Lead, not more than	0.60%	0.80%	1.60%
Iron, not more than	0.03	0.04	0.08
Cadmium, not more than	0.50	0.75	...
Total Lead, Iron and Cadmium, not more than	1.00	1.25	...

American Brands of Zinc[4]

Brands	Description	Producers
American-Illinois	Prime Western	Amer. Zinc, Lead & Smg. Co.
Anaconda High Grade	Electrolytic	Anaconda Copper Mining Co.
Anaconda Electric 99.99 + %	Electrolytic	Anaconda Copper Mining Co.
Arkansas	Prime Western	Sandoval Zinc Co.
Athletic Hilo	Brass Special	Athletic Min. & Smg. Co.
Athletic Select	Intermediate	Athletic Min. & Smg. Co.
Athletic Service	Prime Western	Athletic Min. & Smg. Co.
A. Z. & C. Co.*	B. S., Select. & P. W.	The American Metal Co.
Bertha	High Grade	The New Jersey Zinc Co.
Bunker Hill 99.99 + %	Electrolytic	Sullivan Mining Co.
B. Z. Co.†	B. S., Select. & P. W.	The American Metal Co.
Eagle-Picher	P. W., Select., B. S. & Inter.	Eagle Picher Lead Co.
Evanwall 99.99 + %	Electrolytic	Evans-Wallower Zinc Co.
Granby	B. S., Select. & P. W.	Amer. Zinc, Lead & Smg. Co.
Grasselli Chem. Co. (The) Meadowbrook, W. Va.	Prime Western	The Grasselli Chemical Co.
Grasselli No. 1	Prime Western	The Grasselli Chemical Co.
Grasselli Intermediate	Intermediate	The Grasselli Chemical Co.
Grasselli Select	Brass Special	The Grasselli Chemical Co.
Hegeler Brass Special	Brass Special	The Hegeler Zinc Co.
Hegeler Selected	Select	The Hegeler Zinc Co.
Hegeler Standard	Prime Western	The Hegeler Zinc Co.
Horse Head	High Grade	The New Jersey Zinc Co.
H'se H'd Spec'l 99.99 + %	Spe'l Hi. Gr.	The New Jersey Zinc Co.
Ideal	Intermediate	General Smelting Co.
Illini	High Grade & Intermediate	Illinois Zinc Co.
Illinois	B. S., P. W. & Select	Illinois Zinc Co.
Kusa Spelter Co.	B. S. & P. W.	Kusa Spelter Co.
Mascot	High Grade	Amer. Zinc, Lead & Smelt. Co.
Media	Prime Western	United Zinc Smg. Corp.
M. & H.	B. S., P. W. & Intermediate	Matthiessen & Hegeler Zinc Co.
M. & H.	Select. & High Grade	Matthiessen & Hegeler Zinc Co.
Nassau	Prime Western	The New Jersey Zinc Co.
National	B. S., P. W. & Intermediate	Int. Min. & Metals Corp.
Quinton	B. S. & P. W.	Quinton Spelter Co.
Sandoval	Prime Western	Sandoval Zinc Co.
Selected	Prime Western	Illinois Zinc Co.
Superior	Intermediate	Superior Zinc Corp.
Tadanac	Prime Western	The Cons. Min. & Smg. Co.
Tadanac A	High Grade	The Cons. Min. & Smg. Co.
U. S. Z. Co.	Prime Western	Amer. Smelt. & Refg. Co.
Victor	Intermediate	General Smelting Co.

* Langeloth, Pa. † Blackwell, Okla.

Metallic zinc powder, or "zinc dust," is a by-product of the distillation process. It consists of minute globules of metal, coated with oxide, and is formed as a result of too rapid cooling or too great dilution of the zinc vapor. It usually collects in the "prolongs" of the condensers. Zinc dust is also manufactured by atomizing the molten metal. Deliberate manufacture of zinc dust in the United States was started on a commercial scale in 1910 at the Pueblo, Colo., plant of the United States Zinc Co. Grasselli Chemical Co. followed in 1911, and by 1917 thirteen companies reported production. At present, the greater proportion of zinc dust produced is derived from secondary metal.

The early use of zinc dust was almost entirely in the cyanide process for the recovery of gold. By 1915, the sherardizing industry[5] began to account for a portion of the tonnage, but in recent years it is believed that this application has declined to a comparatively small proportion. An important use is in the manufacture of dyestuffs and other organic chemicals, where it functions as a reducing agent. Of special interest is zinc hydrosulfite, which is used in the textile industry for discharging colors and in the paper industry for bleaching. An increasing amount of zinc dust is finding an application in corrosion resistant paints. It is also used in connection with oils and greases as a pipe thread compound to seal joints and resist corrosion, and as a temporary corrosion resistant coating for machinery, etc.

The production of zinc dust (1914-34) is reported in the following Table 3. It is interesting to note the comparatively small decline in the market during the depression years, indicative of the relatively satisfactory position of the chemical industry during this period. A considerable amount of zinc dust is used in the purification of zinc solutions for the electrolytic production of slab zinc and zinc salts. The amounts so used, however, do not appear in the total figures of the Bureau of Mines in as much as they ultimately appear in zinc products.

Table 3—Zinc Dust Production (U. S. A.)*

Tons 2,000 pounds

1914	1,004	1925	8,314
1915	1,755	1926	7,994
1916	2,609	1927	8,098
1917	5,913	1928	9,172
1918	6,995	1929	11,050
1919	6,798	1930	9,237
1920	11,529	1931	10,611
1921	3,005	1932	9,440
1922	7,253	1933	11,157
1923	8,052	1934	10,283
1924	7,957		

* Source—U. S. Bureau of Mines.

REFERENCES

1. Ernest A. Smith, "The Zinc Industry" (1918).
2. Agricola "De Re Metallica." Translated by H. C. and L. H. Hoover (1912).
3. Includes slab zinc used for the manufacture of French Process zinc oxide, lithopone, atomized zinc dust, zinc for wet batteries, slush castings, and the desilverization of lead.
4. From "Metal Statistics" 1935. *American Metal Market.*
5. Coating metal articles with zinc by heating with zinc dust in a closed container.

Gasoline from Coal at Billingham

By C. H. S. Tupholme

NO British chemical plant has aroused so much speculation as the gasoline-from-coal operation at Billingham. This plant has been formally opened, and it is now possible to give some details of its operation.

The hydrogen-producing process used is shown in Fig. 1. Coke from the ovens is transferred directly to the water-gas plant. The water gas is purified from sulfur and treated with steam in the presence of an organic tin catalyst injected continuously to give catalyzed gas, which is a mixture of hydrogen, carbon dioxide, and a small amount of carbon monoxide. This gas is compressed and purified from carbon dioxide by water scrubbing at 50 atmospheres, and from carbon monoxide by copper solution scrubbing at 250 atmospheres. The gas flows through duplicate high-pressure mains to the gasoline plant, where it enters the circulating machines. These operate with 230 atmospheres suction pressure and 265 atmospheres delivery pressure.

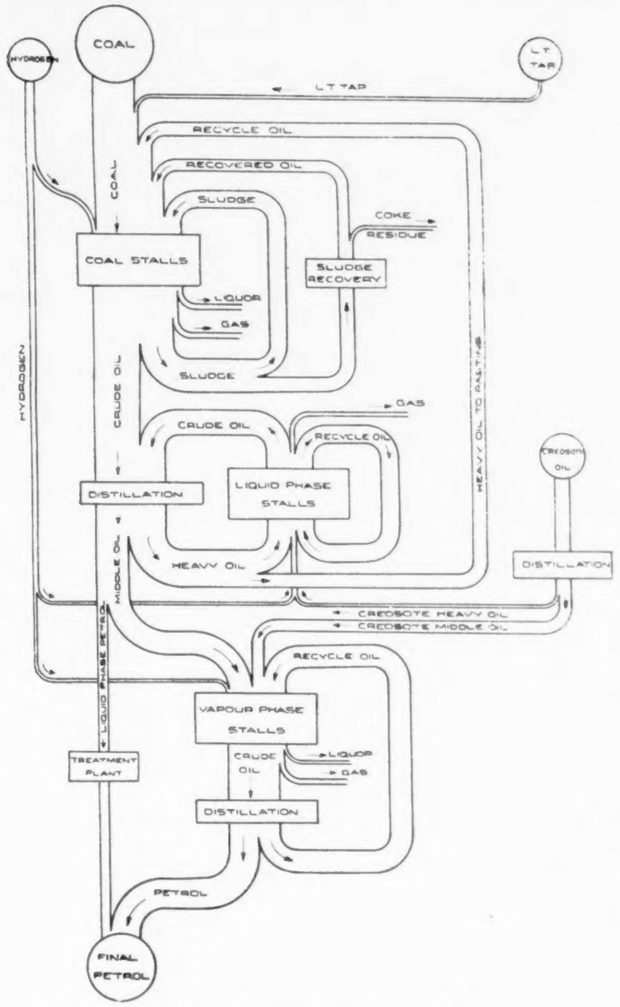


Figure 2. General flow sheet of the process as worked at Billingham.

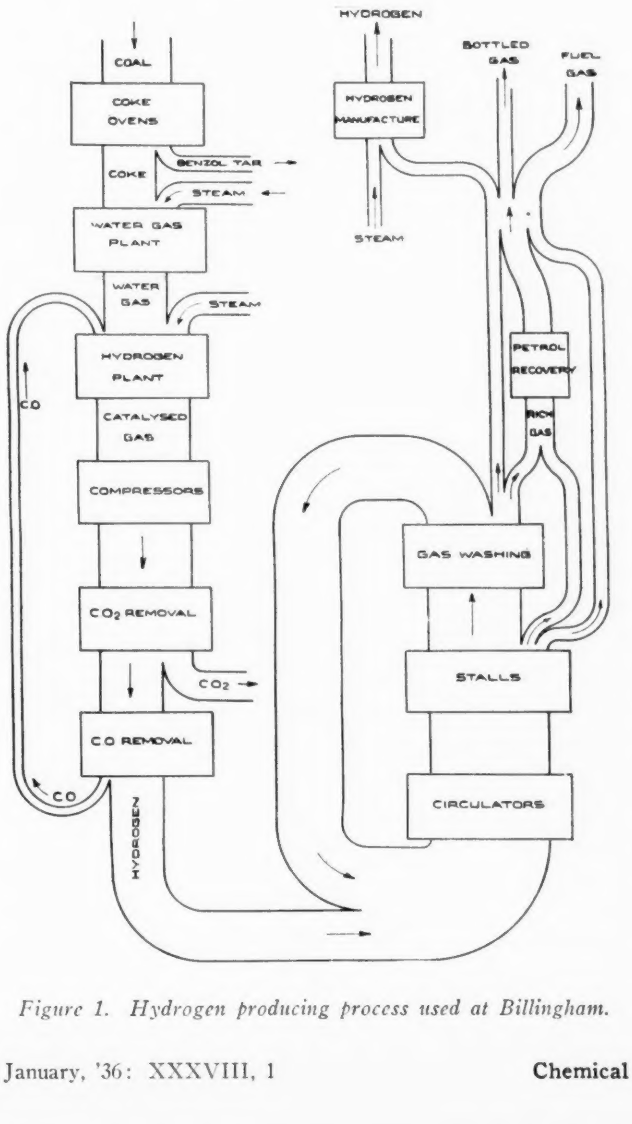


Figure 1. Hydrogen producing process used at Billingham.

The circulating hydrogen picks up nitrogen from the make-up gas as well as methane, ethane, propane and butane formed in the process. Part of these gases is removed by solution in the products themselves, and is recovered upon release of pressure. The purity of the circulating gas is finally controlled by scrubbing with oil at full pressure. The hydrocarbon gases readily dissolve in oil, and are recovered upon release of pressure. Fortunately, nitrogen is more soluble than hydrogen in oil, and thus is similarly removed from the system.

The methane, ethane, propane and butane are now burned under the boilers. Although not wasted, the most economic use is not made of them, and a plant is being erected at Billingham for the manufacture of hydrogen from these gases by treatment with steam in catalysts. This process, worked out originally by I. G. and Standard Oil, provides the latter with the hydrogen for their hydrogenation plant in America.

The Billingham unit will be ready early this year, and all future extensions and other hydrogenation plants will probably obtain the major part of their hydrogen from similar units.

These hydrocarbon gases give in Britain a supply somewhat equivalent to the natural gas of America and other countries with oil fields. Part of this gas is already in commercial use. The butane is separated, liquefied, bottled and sold to the Calor Gas Distributing Co., who are developing the use of butane for domestic purposes. Phenol, cresol and high homologues are available in substantial quantities in the crude product from coal, but are not yet worked up.

The process flow sheet at Billingham is shown in Fig. 2. Low temperature tar is used as part of the pasting oil. The creosote oil is distilled, and the heavy fraction hydrogenated in the liquid phase, while the light fraction passes directly to the vapor phase. Later all the creosote oil may be used as pasting oil, since it is apt to contain impurities which give trouble in the vapor phase.

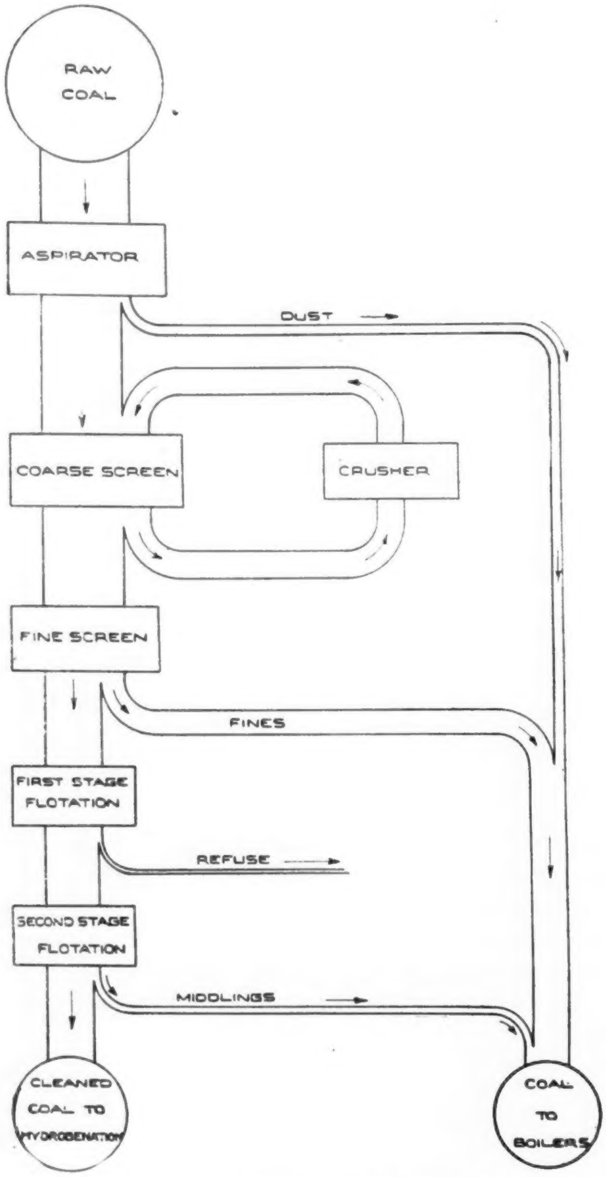


Figure 3. Operation of the sand and water flotation process.

The Chance process is used for making the clean coal required at Billingham. It depends on floating raw coal on a suspension of sand in water. It is necessary first to remove all dust and fine particles of coal by air elutriation, followed by screening. The subsequent sand and water flotation process operates in two stages. First the coal is separated into refuse of low carbon content and a moderately clean coal of about 7 per cent. ash content. This partially clean coal in the second stage is separated into clean coal with not more than 2½ per cent. ash and middlings with 15 per cent. ash (Fig. 3). The coal-cleaning unit is adjacent to the boiler installation so as to use the handling facilities already installed there. Fines and middlings from the coal-cleaning plant pass by band conveyors to the main boiler plant, a powdered fuel installation. The clean coal, taken by truck to the hydrogenation plant, is stored in bunkers holding two days' supply.

The clean coal passes to weighing machines contrived to deliver coal, pasting oil, and catalyst in the required proportions, and all fed simultaneously into the grinding mills which grind up the coal and mix it with pasting oil. The coal "paste" contains 50 per cent. coal. It is quite fluid and reasonably stable. The injectors for delivery of coal paste against the required pressure of 250 atmospheres are hydraulically operated.

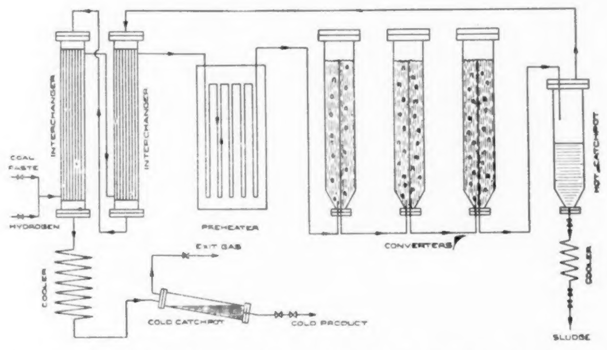


Figure 4. The hydrogenation units showing general arrangement of each stall.

The water for power purposes is supplied from centrifugal pumps delivering at 40 atmospheres.

The coal paste then passes to the hydrogenation units similar in design to the other units used for heavy oil and vapor phase hydrogenation (see Fig. 4). The coal paste and hydrogen are mixed together and heated to reaction temperature first in heat exchangers and secondly in gas-fired preheaters. The coal, oil and hydrogen go together through the converters in series. On leaving the last converter, the gases and vapors are separated from the residual heavy oil which contains the ash and unconverted coal. This residual oil is let down in pressure separately, part of it is used for making up the coal paste and part treated for recovery of oil and solid coke. The gases and vaporized oils go to the heat exchangers and coolers. The liquid oils are separated under pressure, and the gases go back to the circulators, after washing out any excess hydrocarbon gases.

The converters, heat exchangers, and preheaters of all units are in one line on heavily piled foundations. In each stall, as a unit is called, the converters, heat interchangers and interconnecting piping, which are at elevated temperatures, are separated from the rest of the plant by a high brick wall which acts as a fire screen. This wall, on the west side of the plant, is open to the east. This is very convenient for maintenance work, but access is not otherwise permitted to the space in front of the operating stalls. The general arrangement of each stall follows the line diagram given in Fig. 4. Heat interchangers, catchpots, converter forgings, gas-fired preheaters, and coolers for the stalls, are al! interchangeable.

A Titan crane conveys converters and other heavy forgings to the maintenance building where repairs are carried out. The converters are designed so that the heavy and expensive main forgings can rapidly be transferred to a new set of internal parts.

Each pair of stalls has a roomy control room which contains all instruments and valves. From the control room the stall can be run or in case of emergency isolated from the rest of the plant and the pressure can be blown down to vessels constantly filled with carbon dioxide.

The crude products from the hydrogenation plant are released in pressure at the control room and travel along high-pressure pipes to the let-down stations situated at the south end of the plant.

The heavy oil let down is pumped from here partly back to the paste preparation plant and partly to sludge recovery where it is separated into coke for boilers and oil for making up paste.

The light oil products are released in three pressure stages. Thus, the gas is separated into a lean gas and a rich gas which must be treated for recovery of light fractions of gasoline. The crude liquid product flows through meters into storage tanks in which the ammonia liquor settles out. The rich gas released from the final pressure stage is stored in a holder and compressed to 4½ atmospheres for recovery of gasoline at the distillation plant.

Crude oil storage is considerable to enable the hydrogenation and distillation plants to run independently. In the distillation plant are the following units:

1. Vacuum still for separation of creosote oil into middle oil and heavy oil.

2. Vapor-phase still and gasoline stabilizer working at a pressure of 4½ atmospheres, separating vapor-phase crude product into middle oil and stabilized vapor-phase gasoline.

3. Liquid phase distillation unit, combined with gasoline recovery plant. The crude liquid phase product is separated into stabilized gasoline, naphtha, middle oil and heavy oil. The unit also contains an absorber and stripper to separate the gasoline from the compressed rich gas from the pressure release station. A butane unit is included. This plant works at the same pressure of 4½ atmospheres.

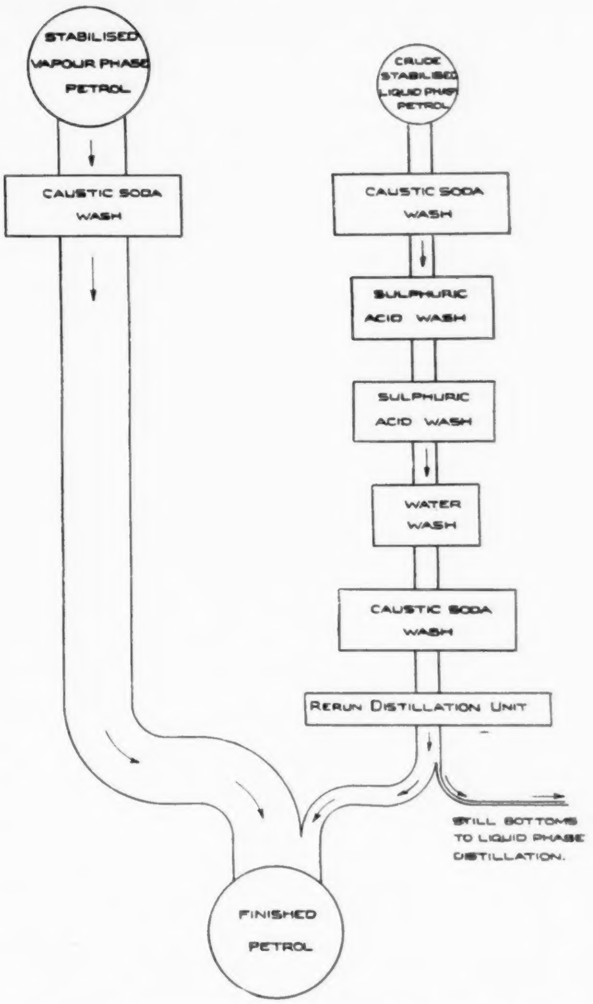


Figure 5. Diagram of the treatment and re-run plant.

Distillation products go to storage tanks of sufficient capacity for routine shut-downs of the distillation and hydrogenation units. All the gasoline is immediately washed with caustic soda to remove H_2S. The gasoline is stored under nitrogen.

The vapor-phase gasoline requires no refining after its soda wash. The liquid phase gasoline goes to the treating plant, washed with sulfuric acid and caustic soda, and finally re-run. Fig. 5 diagrams the treatment and re-run plant, which follows normal practice. The finished gasoline is pumped to the final storage tanks, a mile distant from the hydrogenation plant and adjoining a loading jetty on the River Tees.

Gasoline yield from coal calculated on an ash-and-moisture-free basis is greater than the 60 per cent. formerly published. The company prefers, however, not to give new figures until the plant has operated a longer time and really accurate figures are available. The yield of gasoline from tars and tar oils varies from 80-90 per cent. by weight.

The most important figure is the over-all coal consumption. On a new plant, in which the major part of the hydrogen requirements would be made by the

methane steam process, it is estimated that the over-all consumption of raw coal would vary from 3.5 to 4 tons per ton of gasoline, the exact figure depending upon ash and moisture content of the coal, and its suitability for the process. The thermal efficiency is therefore 40 per cent. which compares favorably with 25 per cent. for generation of electric power, and 55 per cent. for gasification.

In the Billingham plant, the hydrogen is not made from hydrocarbon gases, but from coal via coke and water gas. The over-all raw coal consumption is 5 tons per ton of gasoline. This higher figure is primarily due to the lower efficiency of coke ovens followed by water-gas generators compared with the catalytic manufacture of hydrogen from hydrocarbon gases, but is partly compensated by credits for the tar, benzene, and gas by-products. A further 100,000 tons per year of coal are used for making the hydrogen and power required for the hydrogenation of creosote oil and tar, so that the total additional coal for the gasoline plant is 600,000 tons per year. The total coal consumption at Billingham, including that required for chemical manufacture is between 1¼ and 1½ million tons per annum.

The following table gives the essential properties of typical gasolines made by the hydrogenation process. "1" is a gasoline directly from coal with specifications like No. 1 spirit (the highest-class offered for automobiles). "2", a vapor-phase gasoline made up to a typical ethyl specification with lead. "3" complies with the Air Ministry's latest specifications for 87 octane number.

The gasoline made is of uniformly good quality, and gives no difficulty in refining. The high volatility will be noted, since although this characteristic is essential for modern motor fuels, it is not generally possessed by gasoline made from coal.

Properties of Hydrogenation Gasolines

	1	2	3
Sp. Gr.	0.740–0.745	0.734–0.738	0.730
I. B. P.	35° C.	35° C.	35° C.
90% vol. recovered at	158° C.	160° C.	150° C.
F. B. P.	170° C.	170° C.	165° C.
Residue	1.0%	1.0%	1.0%
Loss	1.0%	1.0%	1.0%
% Distillation + loss			
At 70° C.	20 %	19 %	21 %
At 100° C.	40 %	40 %	50 %
At 140° C.	75 %	75 %	87 %
Reid vap. pressure at 100° F.	9 lb. per sq. in.	9 lb. per sq. in.	7 lb. per sq. in.
Octane No. C.F.R. motor method	71–73	80	......
Octane No. C.F.R. aviation method	......	......	87
Color	+25 Saybolt	Red	Blue
Odor	Marketable	Marketable	Marketable
Sulfur, % by weight	0.05	0.01–0.02	0.01–0.02
Doctor test	Negative	Negative	Negative
A. S. T. M. copper strip corrosion test	"	"	"
Gum, Pyrex dish without air jet (mgm./100 ml.)	2.0	up to 3.0	up to 3.0

Industry's Bookshelf

Latex in Industry, by Royce J. Noble, 384pp. The Rubber Age. $7.00.

Latex technology should no longer leave a noticeable gap in technical literature. Dr. Noble's book answers questions arising daily and constitutes a valuable reference for all those working with this age-old raw material. Any successful attempt to assemble large amounts of accumulated knowledge is worthy of high praise, and the author has done his work in concise and workmanship fashion.

The Chemistry of Synthetic Resins (2 vols.), by Carleton Ellis. 1615pp. Reinhold Publishing Corp. $19.50.

Written by an authority, this long-awaited reference work will be cordially welcomed in the rapidly developing synthetic resin and plastic fields. Impressive through its bulk alone, its many pages are convincing evidence that Ellis has done, as usual, a thorough job with his biography of industrial chemistry's youngest child.

The Preparation of Engineering Reports, by Thomas R. Agg and Walter L. Foster, 192pp. McGraw-Hill. $1.75.

The need for clear writing and forceful presentation in setting up reports makes this manual especially valuable. A thorough, detailed treatment of the subject leaves little to the imagination, yet the text emphasizes originality of preparation.

A Laboratory Manual in General Chemistry (4th Ed.), by William Foster and Hubert N. Alyea, 177pp. Princeton University Press. $1.75.

Thoroughly revised, and intended for use with Dr. Foster's "Introduction to General Chemistry," this Manual enlarges the general study to include elementary analysis and synthesis. An up-to-the-minute book, complete and of better-than-average instructive value.

Neutrality, Its History, Economics and Laws, by Philip C. Jessup and Francis Deak (Vol. I), 294pp. Columbia University Press. $3.75.

The daily tightening of international affairs focuses attention on this ancient problem. Laws of neutrality are primarily economic, and in this first volume, the authors discuss neutrality of ships at sea, disposal of contraband, laws of blockade, and neutral duties. Of particular interest to Americans interested in war-trade, this book gives a thorough understanding of what one day may become a vital question.

Steel—Dictator, by Harvey O'Conner, 383pp. John Day.

Inflammatory material, this revealing history of the "Kingdom of Steel," but exciting reading, whatever your sympathies. Mr. O'Conner has written to shock. Though his curtain lifting tends toward only one side of the stage, his book is good reading, if you like the howl of conflict between worker and the boss.

Simple Science, by Julian Huxley and E. N. da G. Andrade, 688pp. Harpers. $3.50.

Two outstanding scientists have collaborated on this clear and sympathetic outline, which places its greatest emphasis on physiology and the more personal problems of man. Science out of the classroom and into everyday life would be a fair subtitle.

Monastral Fast Blue BS

Properties and Uses of the Sensational New Dyestuff Introduced by I. C. I., Ltd.

SINCE the discovery of the first coal-tar dyestuff in 1856, efforts to provide new and improved products for the color-consuming industries have been untiring. In the inorganic field little outstanding progress has been made in the discovery of new blue pigments since the introduction of Prussian blue in 1704 and of synthetically-produced ultramarine in 1826. Enormous developments have, however, taken place in the organic field, particularly in the production of the insoluble pigment dyestuffs. In this class we have a range of yellows, oranges, reds, scarlets, maroons, violets, greens and blacks, possessing properties which generally meet the demands of the pigment-consuming industries.

These industries cover the manufacture of oil paints and enamels, cellulose lacquers, synthetic resin finishes, printing inks, coated papers, wall-papers, linoleums, artists' colors, distempers, water paints, leather and leather-cloth, rubber, and molding powders, each requiring colors having properties which are peculiar to the individual industry concerned. The requirements of these industries, are, to a large extent, adequately met by either natural, inorganic or organic coloring matters in all shades except blues, and the production of suitable blue pigment dyes has always been a major problem. In considering the available blue pigments, it is found that they all possess inherent faults which render them unsuitable for one purpose or another. Ultramarine is destroyed by acids, even in a dilute form; Prussian blue is destroyed by alkalies. In the organic field, the blue lakes from the coal-tar dyestuffs and certain water-insoluble blue dyestuffs, while meeting the needs of some industries, are entirely unsuitable for others. The quest for a universal blue pigment dyestuff is one at the end of which is a prize worthy of the seeking and this abstract from *The Chemical Age*, Dec. 7, '35, p. 514, tells of the accomplishment of this end in the production of Monastral Fast Blue BS, by I. C. I., Ltd. It is an insoluble pigment dyestuff possessing a most beautiful shade of blue. From a reddish blue in strong shades, it merges through varying shades of blue to a brilliant greenish blue in pale (pastel) shades. It has amazing properties in that it appears to combine in itself all the most desirable properties of the ideal blue pigment dyestuff, and so is suitable for practically all pigment dyestuff-consuming industries. Its fastness to light is excellent, while it is absolutely fast to acids, alkalies and lime. It is completely insoluble in oil, spirit and nitrocellulose solvents. It will withstand temperatures up to 390° F., rendering it particularly suitable for tin-plate printing and stoving enamels. As a pigment it is of particular interest to manufacturers of oil paints and enamels and cellulose lacquers, enamels, printing inks, distempers and water paints, molding powders, soaps, sealing waxes, artists' colors, wall and coated papers, leather and book cloths, linoleums and all products where general all-round fastness and brilliance of shade are of major importance.

Because of its all-round general fastness, texture and working properties, this new blue is the nearest to the ideal blue pigment dyestuff yet produced. It will be marketed in both paste and powder forms, and while the uses to which it can be put have not been fully explored, it can definitely be stated that there is no other blue pigment which possesses such unique fastness, combined with extreme brilliance of shade, purity of tone and high tinctorial value.

Taking its various potential industrial applications, it should be of particular importance to the printing ink industry, and spectro-photometric analysis shows it is the nearest approach to the ideal trichromatic blue yet produced. In three-color printing, it supplies the need for a true "minus red" pigment. With a broader reflection band extending on both sides of the blue-green portion of the spectrum than the standard blue-green ink of the Federation of Master Printers, it will thus not only give, by admixture, better greens and purples, but should greatly increase the range of three-color work generally. Moreover, its all-round fastness, good-working properties, ease of wetting, and brilliance make it particularly suitable for such exacting printing operations as soap wrappers; while its heat resistance enables it to stand up to the number and severity of the baking operations required in modern multi-color tin-plate lithography.

Such functions as texture, ease of wetting, oil absorption, floating, shade and strength all conform exceptionally well to established requirements when Monastral Fast Blue BS is used in the manufacture of paints and lacquers. Used in combination with the Monolite Fast Yellows or the lead chromate pigments, it gives non-floating greens which are brighter, stronger and less liable to cause livering than the normal Brunswick greens—a point which should be of special interest to manufacturers of nitrocellulose lacquers and synthetic resin finishes, in which the effect of the media on the floating of greens is an important problem. Having no harmful effect on the lacquer, either in bulk or as a film, and giving a rich, reddish blue in mass-tone and a brilliant greenish blue on reduction, it should come as a boon to the nitrocellulose lacquer industry, in which the fast-to-light blue pigments hitherto available have been practically limited to Prussian blue, with its attendant grinding difficulties.

In the field of synthetic resin finishes, the new pigment, in conjunction with drying-oil or thermo-hardening glyptals, offers a paint system where the pigment (unlike such colors as ultramarine) does not adversely affect the exceptional durability of the vehicle, and which possesses outstanding resistance to light and heat. Being chemically inert, and having no harmful physical effect on the film, it may be used in oil paints without risk of livering, chalking and loss of gloss. In addition to requiring half the grinding time of Prussian blue, it is more light-fast, and has more than twice the tinctorial power of that pigment. It is brighter in reduced shades than either Prussian blue or ultramarine, while its oil absorption is of the same order as Prussian blue.

Monastral Fast Blue should also supply the need for a brilliant blue pigment suitable for use in distempers. Being fast to the alkaline reaction of lime, it is unaffected even when applied to freshly plastered walls, and it should be of great value for the production of the different hues of blue and green needed in distempers. The same qualities point to its value in the wall-paper and paper-coating trades, in which it should help to meet the present demand for bright and delicate pastel shades in wall-papers.

For the paper trade, the new pigment compares very favorably, both in fastness and tinctorial power, with the vat dyestuffs commonly used in pigment form, and paper dyed with it is fast to light, acid and alkali, and is free from changes in shade when viewed in artificial light. Being marketed in the form of a highly dispersed paste, the full depth of shade is very rapidly developed on addition to paper stock in the beater, and the addition of the usual sizing agents only is required to fix the color firmly upon the fibres, and to produce paper free from two-sidedness.

It should also advantageously replace the natural and inorganic pigments and lakes used for coloring the nitrocellulose dope in the manufacture of leather cloth. Being also fast to light in a greatly reduced shade, it is also particularly suitable for the production of fast to light pastel shades for book cloth, in which it is unaffected by washing or sponging with alkaline

cleansers. For coloring linoleum, it reliably withstands high mixing temperatures, is unaffected during the maturing process, and is fast to repeated washings and scourings with alkaline agents. It also opens up new possibilities in coloring concrete, cement tiling, mixed cement stucco, and modern wood cement flooring compositions. As a rubber pigment, it gives excellent shades in all rubber processes, and under all conditions of vulcanization. Its use in plastic compositions is ideal, since it is capable of resisting, without change, the highest molding temperatures as well as the effect of formaldehyde and of different catalysts. Finally, in textile printing, it offers a means of securing all the effects to be obtained from mineral pigments without having to guard against their known failings.

Industrial Disinfectants

Need for Standard Testing and Better Classification

A recent paper on developments in industrial disinfectants, delivered by J. Gibson to the London Society of the Society of Chemical Industry, and reported in *The Chemical Age*, Dec. 14, '35, p540, dealt largely with industrial disinfectants for large-scale disinfection, rather than specialized germicides. The desirable properties of the ideal fluid disinfectant were summarized as: (1) high germicidal activity; (2) stability and homogeneity on storage; (3) coefficient (germicidal activity) maintained under practical conditions of use, especially in contact with various forms of organic matter; (4) stability and coefficient maintained when diluted with hard, brackish or sea water, or with soap solution; (5) non-poisonous; (6) agreeable smell; (7) non-caustic; (8) without action on metals and textiles.

In discussing some of the disinfectants from the point of view of this ideal specification, the author said that mercuric chloride has a comparatively modest coefficient and is extremely poisonous. Mercury salts are rapidly put out of action by many forms of organic matter, being precipitated by albumen, soap, etc., and in these respects fail badly when compared with the author's specification; in fact, there is nothing to recommend them. Hypochlorite solutions have fairly good coefficients, but in the presence of even small quantities of organic matter they lose their germicidal efficiency very rapidly. They deteriorate on storage, can not be stored in metal containers, and have a bleaching action on colored textiles. However, hypochlorites are almost ideal for certain purposes. They are most efficient for the disinfection of swimming water, and the fact that there is no objectionable smell or taste after their use makes them particularly valuable for sterilizing plant in food factories, etc. In both cases, the amount of organic matter present is negligible.

A table showing the effect of organic matter on the coefficients of disinfectants stressed the very rapid fall in the coefficient of hypochlorite solutions in the presence of even small quantities of organic matter. Coal tar fluids are not affected to anything like the same extent. Potassium permanganate, despite a high initial coefficient, also compares unfavorably with coal tar fluids. Formalin in solution has little claim to the title disinfectant, although it is said to have considerable efficacy in the gaseous form.

Coal tar disinfectants are a class of products which, although having the common characteristic of being made from derivatives of coal tar, vary greatly among themselves both as to their composition and properties. The active ingredients are the phenols—carbolic acid and its higher homologues. Apart from carbolic acid itself (seldom present in disinfectants), the phenols are practically insoluble in water, and emulsifiers are therefore used to make them soluble or miscible. It is possible to make coal tar fluid to comply with any one (or even several) of the points of the author's specification, but, unfortunately, no one type of fluid satisfied all the points. The coal tar fluids can be classified into the two main groups of black and white fluids. A black fluid made from creosote oil and phenols, emulsified with soap and poured into water, forms a white emulsion. A white fluid made from the same coal tar raw materials, *i.e.*, creosote oil, cresylic acid and high boiling acid, but using a different type of emulsifier, usually glue or gelatin, casein or dextrin, and smaller proportions of other substances, might be added with the object of lowering surface tension and increasing the stability of the fluid and its emulsions in water.

The problems of the manufacture of the various types of coal tar disinfectants were briefly reviewed. In the course of some comparisons of the black and white coal tar fluids, disinfection is frequently carried out in conjunction with cleansing operations, and it is therefore important that disinfectants should retain their germicidal activity in the presence of soap solutions. White and black fluids appear equally compatible with soap solutions, but some figures on the effect of soap solutions on the coefficients of the fluids, show a marked difference in their germicidal activity under these conditions, the black being superior to the white. Coal tar fluids cannot claim to be non-poisonous in themselves, but when diluted for use they are quite harmless. Compared with Lysol, both black and white fluids are practically non-caustic. They are without action on metals and textiles, and the danger of staining the latter is very slight at the dilutions usually employed.

Disinfectants are invariably evaluated bacteriologically. The most generally used test is the Rideal-Walker test, introduced in 1903, and recently standardized and published by the British Standards Institution. Most standard tests use *B. typhosus* as the test organism. It is manifestly impossible to devise any single test which would give an indication of the behavior of a disinfectant in all the possible conditions under which it is to be used. The author suggested the adoption of the Rideal-Walker test, admittedly carried out under the most favorable conditions, and division of the effective dilution indicated under these conditions by an agreed figure. This is just as likely to give a satisfactory indication of the requisite dilution for actual disinfection as any other single test, however elaborate. If such a scheme were adopted, disinfectants would have to be divided into various classes according to their chemical properties.

If the main users of disinfectants could get together and thrash out the conditions of test which would typify the principal uses of disinfectants, it should be possible (in collaboration with manufacturers) to work out a standard test, with suitable modifications to simulate different conditions under which disinfectants are likely to be used. Manufacturers might also be willing to standardize, or at least classify, their disinfectants for certain uses. One trouble is that certain classes of disinfectants, eminently suitable for one kind of disinfection, are sometimes recommended for others for which they are entirely unsuitable.

Leather

The value of chlorinated rubber in leather finishes was discussed at a meeting of the British Section of the International Society of Leather Trade Chemists by M. C. Lamb and W. E. Chapman who gave the results of an investigation on this subject originally undertaken on behalf of the Federation of Curriers, Light Leather Tanners and Dressers, and embodied in a private report issued in 1933. The *Chemical Trade Journal* in reporting this, states that the film produced when chlorinated rubber was dissolved in xylene and allowed to evaporate was the most suitable, being free from blushing, crinkling, or "orange peeling." Conferment of plastic properties on the film was satisfactorily effected by the addition of dibutyl phthalate and tricresyl phosphate. Castor oil was not very satisfactory. The inclusion of synthetic resin assisted in getting better anchorage.

Excellent results were obtained on application to moroccos to be subsequently wet grained. The application of suitably compounded mixtures of chlorinated rubber, using xylene as the solvent, resulted in the production of a finish possessing excellent gloss, fastness to wet rubbing, and quite impermeable to water.

Tungsten Compound Tanning Agent

A patent assigned to A. C. Lawrence Leather Co., Boston, relates to a white leather tanning process, using a tungsten compound as tanning agent, whereby a completely and permanently tanned leather is produced.

Synthetic Tans for Tanning

Recent patent issued to Alphons O. Jaeger, assigned to American Cyanamid, considers processes of tanning, using synthetic tans, especially those of the sulfonated diarylmethane type. The action on the pelt of the syntans is gentle. There is no tendency to heavy swelling and premature surface tanning, and the disintegration of the cellular structure of the hide is practically eliminated. Because of their high solvent power, these syntans greatly increase the uniformity and speed of tanning with natural tanning agents, and the leather shows greater tensile strength.

Rubber

The production of rubber of any desired plasticity without the use of softeners, which swell the rubber and detract from its quality, is now possible with the use of a rubber peptizing agent, a du Pont product. New agent is the zinc chloride double salt of phenyl hydrazine.

Rubber Plasticizer

The principal use of A-X-F, a new plastic material, is in oil resistant products in conjunction with DuPrene, Thiokol, or rubber. It will plasticize the first two products and will improve their processing qualities. Acts as an anti-scorch with DuPrene in storage and processing. Naugatuck Chemical Co., producers, claim it increases oil resistance more than inert fillers, at the same time increasing greatly the elastic properties.

Deodorants for Rubber Compounding

Five new deodorants for use in rubber compounding are announced by Givaudan-Delawanna, Inc. New series effectively overcomes odor of rubber compounds without imparting undesirable sweet scent.

Textiles

A staple fiber of excellent quality is said to be obtainable from a common variety of seaweed abounding in Japanese waters. The weed is steamed and boiled in a special chemical solution. The fiber produced has the appearance and the "handle" of Egyptian cotton of intermediate grades, is water repellent and heat retaining. Plans are under way for its immediate manufacture in Japan.

Synthetic Wool from Casein

Of interest to the textile and dairying industries is the production in Italy of "synthetic wool" from casein. *Die Chemische Industrie*, quoting a report from The German State Institute for Applied Botany of Hamburg, states that: The "casein rayon" consisted of pale cream fibres, with an average length of 3 to 5 cm. and an average thickness of 0.030 to 0.035 mm. The surface of the fibres presented a somewhat rough channelled structure, and the gases produced on combustion had a marked alkaline reaction. The fibre showed no appreciable swelling in water, while on treatment with iodine it turned yellowish brown. It was resistant to the action of both cold and warm dilute sulfuric acid. Treated with 10% caustic solution, the fibres swelled about 30% and became brittle, particularly on warming. The average tensile strength of the individual fibres was found to be 6 gm., as compared with the 35 gm. of natural wool. The extensibility at break varied between 5 to 75%, against the figure of 62 to 82% obtained with natural wool.

Month's New Dyes

The Dyestuffs Division of du Pont offers Lithosol Fast Green B paste, which produces a yellow shade of green. It is of interest as a pigment for wall-paper printing as it passes the twenty-four-hour fadeometer test for wall-paper light fastness; as a pigment in printing inks and in the beater or as a coating product, combining good fastness with excellent working properties.

General Dyestuff recent releases include Diaminogen A Extra, a direct color, producing grey shades of a bluish cast on cotton or rayon. Also used as a developed color with beta naphthol or Developer MT, producing fast blue blacks or jet blacks of good fastness to washing. Alizarine Supra Sky G is a new dyeing Alizarine color produced by I. G. and marketed by General Dyestuff. Dyed from a Clauber's salt sulfuric acid bath, it produces greenish blues of extreme brilliancy combined with very good fastness to light. Dyes level. Katanol SL, I. G. product, also sold by General Dyestuff is very useful in union dyeing, as the wool remains practically undyed and practically no change occurs even upon long exposure to light. It is recommended as an addition in covering cotton and rayon in unions, especially where high temperatures must be applied for thorough dyeing of the vegetable fibers. It is also adaptable for dyeing halfsilk when the real silk is to be protected from staining and cotton is dyed with direct dyes.

Ciba Co. announces Ciabacet Scarlet BR Powder, new dyestuff of Society of Chemical Industry in Basle, which is particularly valuable for dyeing acetate silk. Having very good fastness and level dyeing properties, it produces somewhat bluer shades of scarlet than the G brand and possesses better pentrating, level dyeing, and light fastness properties. Is suitable for use as a red component for compound shades. Cotton and viscose are only slightly tinted, hence it is valuable for the production of mixed fabrics composed of acetate silk and cotton or viscose.

Metals and Alloys

Coloring iron products in sodium hydroxide with oxidizing agents was recently outlined by two foreign writers in *Metal Cleaning and Finishing*. Coloring in salt melts is very effective but the temperatures are often not permissible if their hardness is not to be impaired. Also, the loss of salt due to particles of salt carried away with the parts on removal from the bath is fairly important. The application of sodium hydroxide baths avoids these disadvantages as they operate at only 150-200° C. The bath must, however, be converted when not in use, as sodium hydroxide is converted by the CO_2 of the air into sodium carbonate; this can easily be precipitated by addition of unslaked lime. A black color is produced in a solution of 400 g. NaOH in 600 g. water with 10 g. niter and 10 g. sodium nitrate; the solution is applied at 120-130° C., the black color appears in 15-30 min. A good solution from brown colors consists of 150 g. sodium hydroxide in 100 cc. water; addition of sodium nitrate and sodium nitrite gives brighter colors, nitrite alone gives spotty appearance. Several other additions, as litharge, potassium cyanide, urea, and ammonium nitrate gave good results. The colors are improved if the surface of the object is first pickled slightly in strongly diluted acetic acid; hydrochloric acid for pickling had a bad effect. After coloring, rinsing in hot water, drying and immersion in hot oil should be applied.

Plastics

French Patent 767,110 relates to the successful manufacture of phonograph records and molded objects from cheap gelatin plastics. Gelatin is treated with plasticizers (lactic acid, castor oil or the like), indurating agents (aluminum acetate, water glass or a natural resin) and an insolubilizing bath of sodium formate solution. Proportions and conditions of treatment are adapted to the degree of hardness, plasticity or other properties desired in the final product. Dyes may be used for color effects.

Water-Resistant Molding Material

A phenolic plastic material, produced by Durez, enables manufacturers to offer molded parts with a water resistance hitherto unobtainable. These parts will stand up for years despite complete and continual immersion in water. Recent applications are: a disinfecting device for telephones consisting of a 50% alcohol solution sealed in a Durez cylinder with protruding wick; toilet tank valve assemblies and float balls, and containers for semi-liquids and water-content creams.

Plastic Vessels for Blood Transfusions

Vessels used for blood transfusions can now be made from synthetic resins. This item, observed in *Kunststoffe*, states that experiments have been carried on with unpigmented synthetic resins to replace the expensive amber ordinarily used. These transfusion vessels are claimed to be superior to those made from amber.

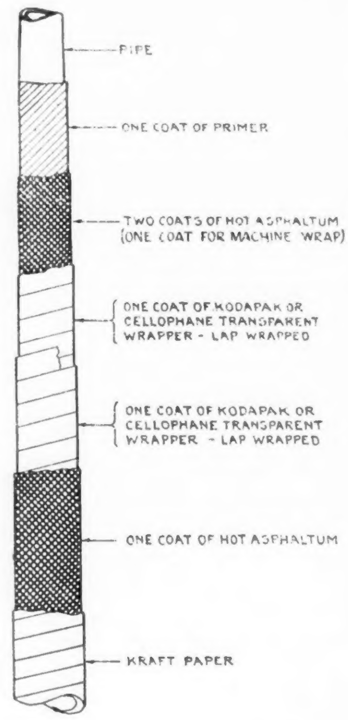


Diagram showing applications of either Cellophane or Kodapak for pipe protection. This application should suggest the possibility of many others of somewhat similar nature.

Coatings

A sheet of synthetic resin, popularly described as a "cross between Cellophane and rubber," was demonstrated by Dr. D. H. Powers, of Rohm & Haas, at a recent convention of the A. A. T. C. & C. New resin is said to have application in shatter-proof eyeglasses; non-cracking patent leather for shoes; flexible paint for rubber; and in fabrics.

Marking Paint in Stick Form

A high-quality "paint in stick form" for uses where messy, wasteful and inconvenient paint-and-brush methods have been prevalent is now on the market under the name "Markal." Manufacturers, Helmer & Staley, claim it is ideal for marking (1) parts to facilitate assembly in production, (2) sections shipped "knocked-down" to facilitate assembly, (3) warehouse and storeroom stocks, (4) for marking owner's name on products and property to prevent theft, (5) for marking pieces and parts serially or for size to facilitate construction, and (6) for writing addresses and shipping directions on products and packages of every kind. Available for cold marking in black, white, red, yellow, and blue sticks; and for hot marking in white and yellow.

Cellophane or Kodapak for Pipe Protection

Cellophane for pipe protection, a new and generous use of this amazing material, serves admirably as a protective measure against moisture and soil impurities. Kodapak, also used in the tests described by Lee Holtz, *Western Gas*, October '35, p22, proved its metal equally as well. The theory employed in the use of two layers of Cellophane or Kodapak, adjacent to one another, is that a slip joint or a "lubricated" surface between the inner and outer coats of asphalt or coal tar is effected. In other words, the steel pipe, the priming material, the first two layers of asphalt or coal tar, and the first layer of Cellophane or Kodapak, constitute one unit which will move freely within the second unit, consisting of a second layer of Cellophane or Kodapak, asphalt coating, and Kraft paper. This outer casing or wrapper, due to the stresses caused by expansion and contraction in the heavier types of soils, will be gripped as in a vise. The slip joint created by the two layers of Cellophane or Kodapak allows the pipe to contract and expand without breaking the bond between the coating and the pipe. From recent examinations of pipe protected as above outlined and laid in heavy adobe soils where soil stresses are very severe, it appears that this reasoning is logical.

Miscellaneous

A review of suggested uses for aluminum chloride, *Revue des Produits Chimiques*, October 15, '35, lists the following: Cracked hydrocarbon distillates may be converted into viscous oils by treating at temperatures above 100° C. with aluminum chloride (French Pat. 608,425). On heating rubber with aluminum chloride under certain conditions, thermoplastic materials are formed (F. P. 615,195). For decolorizing acetone oils and methyl acetone the use of the anhydrous salt has been patented (F. P. 619,857). Several applications of the catalytic action of aluminum chloride have also been disclosed, including production of synthetic resins from polyvinyl alcohol and its esters (F. P. 656,151); condensation of propylene with carbazole to yield resins (F. P. 666,718); production of viscous oils from mineral oils and olefines such as ethylene, propylene and butylene (F. P. 650,799); conversion of ethylene into hydrocarbons boiling between 120 and 200° C. by reaction under pressure with methyl chloride in presence of aluminum chloride (F. P. 695,-125); production of rubber, or ebonite-like products, by condensing polyvinyl esters with unsaturated aldehydes (F. P. 696,008). Salts of aluminum, and aluminum chloride in particular, are asserted to possess anti-cryptogamic properties (F. P. 620,941). To improve the water vapor-absorbent properties of active carbon, aluminum chloride or other hygroscopic salt is incorporated (F. P. 700,511). In the galvanizing industry, an effective fluxing agent is a mixture of zinc chloride and ammonium chloride, together with aluminum chloride (F. P. 701,259).

Plasticizing Agents

"Diolin A" or "Octadecanedioldiacetate," product of du Pont, is used as a plasticizing agent for nitrocellulose and other plastics, in artificial leather composition and also finds some application as a mold lubricant for transparent resins. It freezes at 5°-7° C. (41°-44.6° F.) and has a boiling range of 200°-245°C. At 5 mm. Hg., it is insoluble in water but soluble in most organic solvents.

"Diolin", or "Octadecanediol", or "1, 12 dihydroxyoctadecane", is a white, amorphous, wax-like solid developed by du Pont for use in preparation of plasticizers for nitrocellulose and other plastics. It can also be used in cosmetics, polishes, and for water- and grease-proofing. It melts at 62°-65° C. (143°-149° F.), is insoluble in water but soluble in alcohols, ketones, esters and chlorinated hydrocarbons.

Heavy Water to Check Bacteria

Working with the organism "aerobacter aerogenes," which readily grows in a synthetic medium of inorganic salts and glucose, Drs. C. A. Smucker and H. V. Moyer, of Ohio State University, reported at the Ohio-Michigan Regional Meeting of the A.C.S. that they found the amount of heavy water in the culture controls the rate of growth of bacteria.

Zinc Sulfate in Control Atmospheric Humidity

The control of atmospheric humidity in individual units, show cases, and small rooms for special processing, etc., through the use of zinc sulfate is mentioned in E. P. 396,439. A mixture of dry salts is used, either an anhydrous salt and its solid hydrate, or two solid hydrates of the same salt. Ordinary crystallized zinc sulfate is considered particularly useful because of its cheapness. Most important application of process will probably be in the preservation of valuable pictures, manuscripts, and museum materials.

New Solvent in Analytical Work

Cyclopentadecanone, a new solvent reported by F. Geral, *Anal. Soc. Espan. Fis Quim.*, 1935, No. 323, p438, offers advantages in micro-determination of molecular weight by the cryoscopic method. It melts at 65.6° C., and its wide solvent powers have enabled the author to use it in determining the molecular weights of such complex organic substances as Vitamin D.

Speeding Up Oil Polymerization

The polymerization of vegetable oils may be accelerated by adding 0.2 to 1% mercapto-benzothiazole and 0.1 to 0.5% diphenylguanidine according to Russian Pat. 34,669. Calcium resinate may also be present but is not essential. Substances named by the assignor as retarding the rate of polymerization include linoleic acid (up to 1%) and resinates or linoleates of mercury, copper, strontium and barium, all of which function in the absence of calcium resinate.

Synthetic Wax

A synthetic wax of unusual physical and chemical properties is being manufactured by du Pont and carries the name "Opalwax." It is used in polishes, finishes, linoleum, electric insulation, electric condensers, cosmetics, candles, carbon paper, manufacture of moisture proof plasticizers, and moisture- and grease-proofing paper and textiles. It is a practically odorless, extremely hard, pearl-white solid having an apparent specific gravity of 0.98-0.99 and melting at 83°-86° C. (181°-187° F.).

Creosote Oil in Wood Preservation

Stable and effective emulsions of creosote oil for wood preservation are reported by C. Varadhan and K. A. N. Rao, *Journal of the Indian Institute of Science* and described in *Canadian Chemistry and Metallurgy*. The emulsions (stable at the working temperature of 180° F. and 180 lb. per sq. in. pressure) were prepared on a colloid mill using a variety of stabilizers. Peptone, casein, triethanolamine and Nekal A. E. M. (an I. G. product containing 80% powdered glue and 20% of a sulfonated naphthalene derivative) gave fairly stable emulsions in concentrations of 0.5 to 2%. From all points, Nekal A. E. M. was found to be the best stabilizer for both wood and coal tar creosote emulsions. Fifty per cent. emulsions of coal tar creosote and water prepared with 0.5 to 1% of it remained stable for several months and withstood prolonged boiling. The stability was improved by neutralizing the small amount of free acid in the creosote with 0.5% caustic. In tests, the absorption of emulsion was sometimes twice as much as that of creosote itself, working under similar conditions. While there is a large variation in absorptive capacity, it was apparent that in general the emulsion is absorbed much more easily than creosote. The emulsion is absorbed without being broken down by the cell-walls of the wood. Emulsion-treated samples of wood, exposed during the last two years, have resisted insect and fungus attack.

Propeller De-Icer

In addition to the airplane wing de-icer featured by B. F. Goodrich Co., *The Rubber Age* reports a device for solving the problem when ice forms on propellers. A rubber-covered spinner cap treated with a special oil is used to prevent ice from bridging the hub. The propellers are also covered with rubber on the thrust side around the entering edge and back to the thickest portion. In such manner, the tendency of the ice to stick is reduced, with the natural result that centrifugal force throws it off before it has time to deform or unbalance the propeller blades. Another possibility lies in the continuous flowing of oil over the rubber-covered surface of the propellers while in flight to prevent any formation of ice in the first place.

New Safety Match

A safety match that may be struck on any dry, rough surface as well as on the box will shortly be marketed by the Swedish Match Co. It has all the good qualities of the old type safety match, is not easily blown out, and withstands moisture better.

Higher Ketones

"Higher Ketones" is a mixture of 65 to 70% di-isopropyl ketone and 25 to 30% ethyl isopropyl ketone and is now being marketed by du Pont. The mixture has a boiling range of 114°-127° C. (227°-260° F.); weight 6.8 pounds per gallon at 68° F. Is only slightly soluble in water and has an evaporation rate somewhat slower than N-butyl acetate. It is an excellent nitrocellulose solvent and finds application in varnish formulation, and in softening agents for nitrocellulose plastics (Ketanol).

Nicotine in Anti-Fouling Paints

Nicotine salts do not increase the efficiency of anti-fouling paints, according to the *British Chemical Trade Journal*, reporting on tests made on a ship making a 3-months' voyage to West Africa.

Direct Application of Carbon to Sewage

Experimental work on the use of powdered activated carbon in sewage treatment work where the carbon is applied to the raw sewage is said to be showing excellent results. Work is being done at the Newark, N. J., sewage disposal plant. In this way it is possible to substantially increase the rate of digestion as evidenced by a greater and more rapid evolution of digestion gases. It effectively reduces bulking and foaming, and the sludge carries less odor and dries more readily. A great deal of experimental work has been undertaken here and abroad and wide extension of activated carbon use in sewage treatment is expected in the near future.

U. S. Chemical Patents

A Complete Check-List of Products, Apparatus, Equipment, Processes

Agricultural Chemicals

Production seed disinfectant comprising inner anhydride of a mercurized phenol. No. 2,021,277. Fritz Wolff, Berlin, Pankow, Germany, to Schering-Kahlbaum A. G., Berlin, Germany.

Production dicalcium phosphate for fertilizer use by dissolving crude with solution containing mono salt and free phosphoric acid. No. 2,021,-527. Robert Suchy and Emil Reubke, Bitterfeld, Germany, to I. G., Frankfort-am-Main, Germany.

Production of superphosphates by subjecting calcareous material to attrition in presence phosphoric acid. No. 2,021,671. Lewis Bailey Skinner, Denver, Colo.

Production sodium nitrate in form of substantially globular rounded grains, containing nitrogenous fertilizer salt. No. 2,021,927. Walter Strathmeyer, Oppau, Germany, to I. G., Frankfort-am-Main, Germany.

Preservation of green fodder by addition of wood sugar. No. 2,021,996. Friedrich August Henglein, Cologne-Duetz, Germany, to I. G., Frankfort-am-Main, Germany.

Process driving off ammonia from ammonium phosphate to produce phosphoric acids. No. 2,022,050. Charles Lewis Levermore, Rockville Centre, N. Y., to General Chemical Co., N. Y. City.

Production fungicide. No. 2,022,185. Herman Alexander Bruson, Germantown, Pa., to The Resinous Products & Chemical Co., Inc., Philadelphia.

Production stable calcium hypochlorite pellets by forming mixture of hypochlorite and calcium sulfate. No. 2,023,459. Walter S. Bachman, Los Angeles, Cal.

Process recovering starch from corn. No. 2,023,999. Robert Edman Greenfield and Harold R. Baker to A. E. Staley Mfg. Co., all of Decatur, Ill.

Production insecticide comprising an aromatic thiocyanate. No. 2,024,098. Leon C. Heckert, Bristol, Pa., to Rohm & Haas Co., Philadelphia.

Production insecticidal preparation containing rotenon and veratrin. No. 2,024,392. Herbert Schotte and Karl Gornitz to Schering-Kahlbaum A. G., all of Berlin, Germany.

Cellulose

Process treating water suspension of cellulosic material by reacting with elemental halogen in presence calcium carbonate and lime. No. 2,021,612. James S. Sconce, Niagara Falls, N. Y., to Hooker Electrochemical Co., N. Y. City.

Method and apparatus for precipitating cellulose acetate. No. 2,021,837. Hobart O. Davidson, Meadville, Pa., to The Viscose Co., Marcus Hook, Pa.

Production cellulose mixed ester composition to be formed into film or sheet using triaryl phosphate to increase flexibility. No. 2,021,887. Hans T. Clarke, N. Y. City, and Carl J. Malm, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Production cellulosic organic acid derivative with tributyl phosphate contained as plasticizer. No. 2,021,901. Henry B. Smith to Eastman Kodak Co., both of Rochester, N. Y.

Production cellulose mixed and higher ester compositions containing trialkyl phosphates. No. 2,021,902. Henry B. Smith to Eastman Kodak Co., both of Rochester, N. Y.

Production opaque cellulosic sheeting material. No. 2,022,064. Roger N. Wallach, Briarcliff Manor, N. Y., to Sylvania Industrial Corp., Fredericksburg, Va.

Production organic derivatives of cellulose as yarns or filaments containing an alkyl borate. No. 2,022,411. Henry Dreyfus, London, England.

Production stable organic cellulose esters. No. 2,022,446. Wilhelm Walter, Cologne-Niehl, and Rudolf Hofmann, Dormagen, Germany, to I. G., Frankfort-am-Main, Germany.

Method of treating cellulosic matter using aqueous metallic perchlorate solution, then separating. No. 2,022,589. Alma Dobry to Compagnie de Produits Chimiques et Electrometallurgiques Olais, Froges et Camargue, both of Paris France.

Production cellulose from lignocellulosic materials by extracting lignin with organic solvent. No. 2,022,654. Henry Dreyfus, London, England.

Production cellulose from lignocellulosic materials by extracting lignin with organic solvents containing inorganic basic substances. No. 2,022,-664. Walter Henry Groombridge and Eric Vernon Mellers, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Production substantially lignin-free pulp of cellulose from wood. No. 2,022,872. Clinton K. Textor to Northwest Paper Co., both of Cloquet, Minn.

Production substantially lignin-free cellulose pulp from so-called hardwoods or short fibered wood. No. 2,022,873. Clinton K. Textor to Northwest Paper Co., both of Cloquet, Minn.

Production cellulose ester containing groups of dicarboxylic acids having heterogeneous linkages. No. 2,024,238. Carl J. Malm and Charles R. Fordyce to Eastman Kodak Co., all of Rochester, N. Y.

Refining organic acid esters of cellulose by dissolving in aqueous acetone, filtering, and precipitating. No. 2,024,246. Dennis E. Northrup and Robert C. Burton, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Production organic cellulose esters by reacting cellulosic material with acidylating agent in presence lower aliphatic sulfo acid containing mineral acid radicals. No. 2,024,381. Richard Muller, Heidelberg, Martin Schenck, Mannheim, and Wilhelm Wirbatz and Fritz Muller, Mannheim-Waldhof, Germany, to C. F. Boehringer & Soehne G.m.b.H., Mannheim-Waldhof, Germany.

Production cellulose acetate isobutyrate. No. 2,024,651. Carl J. Malm, Rochester, N. Y., and Charles L. Fletcher, Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Production of mixed esters of cellulose. No. 2,024,658. Thomas F. Murray, Jr., and Cyril J. Staud to Eastman Kodak Co., all of Rochester, N. Y.

Method of extracting cellulose esters. No. 2,024,666. Cyril J. Staud and Edward C. Yackel to Eastman Kodak Co., all of Rochester, N. Y.

Production cellulose from ligno-cellulosic materials. No. 2,024,689. Walter Henry Groombridge and Eric Vernon Mellers, Spondon, near Derby, England, to Celanese Corp. of America, a corp of Del.

Regenerated cellulose sheet or film. No. 2,025,000. Daniel W. Losee, East Patchogue, N. Y., to Johnson-Losee Corp., Long Island City, N. Y.

Coal Tar Chemicals

Production of an aralkyl trithiocarbonate. No. 2,021,726. Raymond W. Hess, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City

Production tetrasulfuric acid ester of leuco-1, 2, 2', 1'-anthraquinone azine. No. 2,022,218. Georg Rosch, Cologne-Mulheim, Josef Haller, Leverkusen-Wiesdorf, and Fritz Helwert, Mannheim, Germany, to Durand & Huguenin A.-G., Basel, Switzerland.

Production mono-n-alkanol derivative of aromatic diamines and polyamines. No. 2,022,245. Erich Lehmann, Bitterfeld, Germany, to General Aniline Works, Inc., N. Y. City.

Production 2, 3-hydroxy naphthoic acid arylamide. No. 2,022,579. Joseph Felix Turski, Warsaw, Poland.

Method of desulfonating diaminodiphenylamine-2-sulfonic acid compounds. No. 2,022,889. Luther M. Lauer, Orchard Park, N. Y., to National Aniline & Chemical Co., Inc., N. Y. City.

Production amino azo compounds. No. 2,022,921. Fritz Mietzsch, Wuppertal-Barmen, and Josef Klarer, Wuppertal-Elberfeld, Germany, to Winthrop Chemical Co., Inc., N. Y. City.

Production diazonium compounds. No. 2,022,923. Anton Ossenbeck, Cologne-Mulheim, and Ernst Tietze, Cologne-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production asymmetrical ureas. No. 2,022,935. Josef Hilger, Cologne-Mulheim, and Carl Taube, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., N. Y. City.

Production aryl mercuric heterocyclic carboxylates. No. 2,022,997. Carl N. Andersen, Watertown, Mass., to Lever Bros. Co., a corp. of Maine.

Production alkyl chloro-dioxy-benzols. No. 2,023,160. William E. Austin, N. Y. City.

Production condensation products of the azabenzanthrone-acridone series. No. 2,023,479. Max Albert Kunz, Mannheim, and Karl Koeberle and Gerd Kochendoerfer, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production fatty mixture capable of being emulsified. No. 2,023,769. Karl Ott, Leverkusen-am-Rhine, and Gustav Manthe, Cologne-Holweide, Germany, to General Aniline Works, Inc., N. Y. City.

Production dioxazine compounds. No. 2,024,525. Georg Kalischer, Frankfort-am-Main, and Werner Zerweck, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production monoalkyl ether of aromatic polyhydroxy compounds. No. 2,024,534. Karl Marx, Hans Wesche, and Karl Bittner, Dessau in Anhalt, and Hans Saenger, Bitterfeld, Germany, to General Aniline Works, Inc., N. Y. City.

Production condensation products of urea. No. 2,024,972. Leon Lilienfeld, Vienna, Austria.

Coatings

Production water repellant coating used also as antiseptic using waxy coating containing 8 hydroxy quinoline. No. 2,021,137. Irwin Stone, N. Y. City.

Use of two-tone metallic finish comprising composite base coat and a top coat containing metallic powder and dye. No. 2,021,152. Theodore A. Neuhaus, Lakewood, Ohio, to The Glidden Co., Cleveland, Ohio.

Production coating composition comprising raw linseed oil and a synthetic resin. No. 2,022,149. Ernest G. Peterson to Hercules Powder Co., both of Wilmington, Del.

Production coating composition containing a drying oil which includes an oxidation controller. No. 2,022,301. Robert L. Sibley, Nitro, W. Va., to The Rubber Service Laboratories Co., Akron, Ohio.

Production coating composition containing drying oil which includes an oxidation controller of hydroacridine. No. 2,022,302. Robert L. Sibley, Nitro, W. Va., to The Rubber Service Laboratories Co., Akron, Ohio.

Production lacquer comprising oil soluble resinous condensation product, hydrocarbon oil, vehicle in oil, cellulose ester, dialkyl phthalate, and a resin. No. 2,022,331. Melville M. Wilson to The Sharples Solvents Corp., both of Philadelphia.

Production of film forming surface by coating a base with lacquer, applying lacquer coating to gelatin layer, covering with gelatin, treating with dichromate. No. 2,022,360. Arthur E. Petersen, Westfield, N. J., to Celluloid Corp., a corp. of N. J.

Production non-gelling lacquer consisting of mixture nitrocellulose lacquers with zinc pigments and aliphatic acid esters. No. 2,023,363. Charles Bogin, Terre Haute, Ind., and Vaughn Kelly, Chicago, Ill., to Commercial Solvents Corp., Terre Haute, Ind.

Production fibrous composition by coating fibers with bitumen. No. 2,023,675. Harry C. Fisher, Norwood, Ohio, to The Richardson Co., Lockland, Ohio.

Patents digested include issues of the "Patent Gazette," Nov. 19 through Dec. 17 inclusive.

Production coating composition comprising starch esterified and dextrinized with weak monobasic organic acid, ammonia, and dry soluble sodium silicate. No. 2,024,123. Webster E. Byron Baker, Lock Haven, Pa., to Stein, Hall & Co., Inc., N. Y. City.

Electrolyte for preparing film on a filming metal comprising solution of ammonium benzoate. No. 2,024,210. Philip E. Edelman to Robert T. Mack, both of Chicago.

Carrier belt for casting transparent sheet material. No. 2,024,826. Edouard M. Kratz, Gary, Ind., to Marbo Products Corp., Chicago.

Coated welding rod. No. 2,024,991. Wilber B. Miller, Niagara Falls, N. Y., to Oxweld Acetylene Co., a corp. of W. Va.

Dyes, Stains, etc.

Production indigoid vat dyestuffs. No. 2,021,267. Norbert Steiger, Frankfort-am-Main, and Eduard Albrecht, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Process for dyeing and printing textile materials. No. 2,021,911. Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., both of Wilmington, Del.

Production azo dye. No. 2,021,917. Mordecai Mendoza, West Didsbury, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Process of dyeing fiber with a vat dyestuff. No. 2,021,932. Richard G. Clarkson, Wilmington, Del., and Frank Willard Johnson, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production halogenated vat dyestuffs of the benzanthronylaminoanthraquinone series. No. 2,022,240. Ernest Honold and Rudolf Muller, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuff. No. 2,022,243. Werner Lange, Dessau-Ziebigk in Anhalt, Germany, to General Aniline Works, Inc., N. Y. City.

Production brown disazo dyestuff. No. 2,022,606. Francis H. Smith, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production vat dyestuff printing paste. No. 2,022,748. Philip H. Stott, Penns Grove, N. J., and Earl Edson Beard, South Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production vat dyestuffs of the benzanthrone series. No. 2,022,884. Edward T. Howell, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production dyestuffs of the anthraquinone series. No. 2,022,956. Henry Dreyfus, London, England.

Production disazo dyestuffs. No. 2,023,176. Hans Krzikalla and Walter Limbacher, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production azo dyestuff. No. 2,023,590. Emmet F. Hitch and Miles A. Dahlen, Wilmington, Del., and Martin E. Friedrich, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production azo dyes of the ice color class. No. 2,023,591. Emmet F. Hitch and Miles A. Dahlen, Wilmington, Del., and Martin E. Friedrich, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process dyeing cellulosic material with azo dyes. No. 2,023,614. William Galloway Reid, Manchester, England, to Imperial Chemical Industries Ltd., Westminster, England.

Production green azo dyestuffs. No. 2,023,615. William Galloway Reid, Derby, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.

Production water-insoluble azo dyestuffs. No. 2,023,773. Gerhard Schrader, Opladen, near Cologne-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production vat dyestuffs of the pyranthrone series. No. 2,023,926. Georg Kranzlein, Heinrich Vollmann, and Werner Schultheis, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., N. Y. City.

Production chrome yellow colors stable to light. No. 2,023,928. Ekbert Lederle and Max Guenther, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., N. Y. City.

Production yellow mono-azo dyestuffs capable of being chromed. No. 2,023,953. Erich Fischer, Bad Soden-am-Taunus, and Herbert Kracker, Frankfort-am-Main, Germany, to General Aniline Works, Inc., a corp. of Del.

Process for discharging dyeings on wool by means of sulfoxylates. No. 2,024,038. Robert Haller, Riehen, near Basel, Switzerland, to firm Society of Chemical Industry in Basle, Basel, Switzerland.

Production monoazo dyes which are water-insoluble. No. 2,024,368. Henry Jordan and Miles Augustinus Dahlen to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production vat and sulfur dyestuff printing pastes. No. 2,024,502. Hermann Berthold, Leverkusen-I. G.-Werk, Germany, to General Aniline Works, Inc., N. Y. City.

Production mordant trisazo-dyestuffs. No. 2,024,797. Ernst Hug, Neu-Allschwil, near Basel, and Max Muller, Basel, Switzerland, to firm "Durand & Huguenin S. A.", Basel, Switzerland.

Production chromatable monoazodyestuffs. No. 2,024,864. Georges Kopp and Pierre Petitcolas, Rouen, France, to Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reunies, Etablissement Kuhlmann, Paris, France.

Production vat dye printing paste comprising an unsubstituted alkali metal anthraquinone sulfonate. No. 2,024,973. Herbert August Lubs and John Elton Cole to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production vat dye printing paste comprising an alkali metal anthraquinone-sulfonate. No. 2,024,974. Herbert A. Lubs and John Elton Cole to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Production vat dye compositions. No. 2,024,975. Herbert A. Lubs and John Elton Cole to E. I. du Pont de Nemours & Co., all of Wilmington, Del.

Explosives

Production copper ammonium salts of diazo amino tetrazole. No. 2,021,478. Willi Brun, Bridgeport, Conn., to Remington Arms Co., a corp. of Del.

Production lead salts of dinitrosalicylic acid. No. 2,021,497. Willi Brun, Krefeld, Germany, to Remington Arms Co., Inc., a corp. of Del.

Production waterproof blasting explosive assembly. No. 2,023,784. William R. Farren and Joseph Smith, Jr., Tamaqua, Pa., to Atlas Powder Co., Wilmington, Del.

Process preparing shot gun shells by first coating with a cellulose ester composition and then impregnating with paraffin composition. No. 2,023,888. Edwin L. Johnson, Brownsburg, Quebec, Canada, to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production double base smokeless powder comprising nitrated flaked starch. No. 2,024,128. Willard de C. Crater, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.

Purification of normally solid organic explosive compounds. No. 2,024,396. William A. Smith, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production priming mixture comprising double salt of potassium nitrate and barium nitrate as oxidizing agent. No. 2,024,406. Alfred Weale, Heswall, England, to I. C. I. Ltd., a corp. of Great Britain.

Fine Chemicals

Production alkali metal hydrocarbide. No. 2,021,567. Anthony M. Muckenfuss, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., a corp. of Del.

Production methylene ethers by reacting hexamethylenetetramine with an alcohol in presence strong decomposing acid. No. 2,021,680. Tom Birchall and Samuel Coffey, Manchester, England, to Imperial Chemical Industries Ltd., Westminster, England.

Production of vinyl esters by heating acetaldehyde with lower fatty acid anhydride in presence non-volatile inorganic catalyst. No. 2,021,698. Granville A. Perkins, South Charleston, W. Va., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Production isopropyl esters of aliphatic acids by reacting propylene with aliphatic monocarboxylic acid in presence sulfuric acid catalyst. No. 2,021,851. Gerald H. Coleman to The Dow Chemical Co., both of Midland, Mich.

Production glycol di-ester by catalytic reaction of an alkylene dichloride with alkali metal salt of lower fatty acid. No. 2,021,852. Gerald H. Coleman and Garnett V. Moore to The Dow Chemical Co., all of Midland, Mich.

Production of vinyl ethers by reacting acetylene in liquid phase with organic hydroxy compounds. No. 2,021,869. Walter Reppe and Werner Wolff, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production substantially chemically pure divinyl ether. No. 2 021,872. Randolph T. Major, Westfield, and William L. Ruigh, Rahway, N. J., to Merck & Co., Inc., Rahway, N. J.

Production vinyl esters by reacting acetylene with an aliphatic mono carboxylic acid in presence of a mercury and fluoride catalyst. No. 2,021,873. Otto Nicodemus and Walter Weibezahn, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.

Production of xanthates by reacting carbon bisulfide vapors with liquid monohydric alcohol and a caustic alkali. No. 2,021,930. Ernest D. Wilson, Larchmont, N. Y., to W-B Chemical Co., N. Y. City.

Preparation of ethylene oxide by reacting beta-chloroethylacetate with a base. No. 2,022,182. Edgar C. Britton, Gerald H. Coleman, and Byron Mate to The Dow Chemical Co., all of Midland, Mich.

Production 3, 3-dimethyl-1-bromo-butane. No. 2,022,485. Frank C. Whitmore and Walter R. Trent, State College, Pa., to Mallinckrodt Chemical Works, St. Louis, Mo.

Production dithiocarbamates by reacting carbon disulfide with an amine, both in fine state of subdivision. No. 2,022,979. Wilhelm Rittmeister, Dessau, Germany, to Deutsche Hydrierwerke Akteingesellschaft, Berlin-Charlottenburg, Germany.

Production soluble lactalbumin. No. 2,023,014. George E. Flanigan and George C. Supplee, Bainbridge, N. Y., to The Borden Co., N. Y. City.

Production heat insulation consisting of low specific gravity and highly vesiculated mass of polystyrol. No. 2,023,204. John Gudbrand Tandberg to Carl Georg Munters, both of Stockholm, Sweden.

Production ester of polyglycerols, ester having at least one free hydroxy group. No. 2,023,388. Benjamin R. Harris, Chicago.

Production of an hydroabietoyl chloride. No. 2,023,473. Clyde O. Henke, South Milwaukee, and Milton A. Prahl, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production acid dicarboxylic esters from dicarboxylic acids and polyhydroxy compounds. No. 2,023,485. Carl J. Malm and Charles R. Fordyce to Eastman Kodak Co., all of Rochester, N. Y.

Production of a salt consisting of polybasic phosphoric acid partly esterified with guaiacol and an organic basic constituent. No. 2,023,551. Salo Rosenzweig, Vienna, Austria.

Production musk-xylene by nitration with commercial grade mixed acid of tertiary-butyl-meta-xylene. No. 2,023,565. Walter V. Wirth, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production tertiary-butyl-meta-xylene by reacting the butyl alcohol with meta-xylene in presence aluminum chloride. No. 2,023,566. Walter V. Wirth, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production aromatic arsonic acid. No. 2,023,751. Karl Stre'twolf, Frankfort-am-Main, Alfred Fehrle, Bad Soden-am-Taunus, and Hubert Oesterlin, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., N. Y. City.

Method effecting addition of an alkali metal to an aromatic hydrocarbon. No. 2,023,793. Norman D. Scott, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production metal carbamates by reacting ammonium carbamate in alcohol with an inorganic metal compound. No. 2,023,890. Ernst Kuss, Mannheim, and Emil Germann, Heidelberg, Germany, to I. G., Frankfort-am-Main, Germany.

Production halogenated acyclic hydrocarbon containing fluorine using antimony halide. No. 2,024,095. Herbert Wilkens Daudt and Mortimer Alexander Youker, Wilmington, Del., and Harry Howard Reynolds, Pennsgrove, N. J., to Kinetic Chemicals, Inc., Wilmington, Del.

Production dithiazyl disulfides by reacting thiazyl mercaptan with hydrogen peroxide in presence of an inorganic acid. No. 2,024,567. Albert M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.

Production dithiazyl disulfides by heating aqueous alkaline solution of mercaptobenzothiazole with aqueous hydrogen peroxide and acid. No. 2,024,575. Albert J. Gracia, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Production mercaptan derivative by reacting a mercapto thiazole with either ammonia or an amine. No. 2,024,606. Lorin B. Sebrell, Cuyahoga Falls, Ohio, to Wingfoot Corp., Wilmington, Del.

Production carbamyl disulfides by reacting 2-benzoyl 4-nitro phenyl sulfur bromide with sodium salt of diethyl dithiocarbamic acid. No. 2,024,613. Jan Teppema, Cuyahoga, Ohio, to Wingfoot Corp., Wilmington, Del.

Glass and Ceramics

Method and apparatus producing fused refractory and abrasive materials. No. 2,021,221 Raymond C. Benner and George J. Easter to The Carborundum Co. all of Niagara Falls, N. Y.

Production refractory material comprising olivine, MgO, silica, iron oxide, a chromite, and a calcined dolomite. No. 2,021,222. George D. Cain, Warren, Ohio, to The Republic Steel Corp., Youngstown, Ohio.

Production optical glass composition comprising compounds of lead, manganese, and titanium. No. 2,021,244. Murray R. Scott to Bausch & Lomb Optical Co., both of Rochester, N. Y.

Treatment of composition and cementitious materials. No. 2,021,513. David H. Levine, New Haven, Conn.
Production of cement raw material from inferior argillaceous limestones. No. 2,021,623. Charles H. Breerwood, Narberth, Pa., to Valley Forge Cement Co., a corp. of Pa.
Process etching solid areas using solid carbon dioxide in etching bath. No. 2,021,687. Irving Gurwick, N. Y. City, to Shellmar Products Co., Chicago.
High temperature furnace insulated wall construction. No. 2,021,742. Arthur S. Nichols, Forest Park, Ill., to The Illinois Clay Products Co., Joliet, Ill.
Production porcelain fired enameled articles of changeable color. No. 2,021,819. Richard H. Turk to The Poreclain Enamel & Manufacturing Co. of Baltimore, both of Baltimore, Md.
Production fired vitreous enameled articles having multicolor finish. No. 2,021,820. Franz Nowak to The Porcelain Enamel & Manufacturing Co. of Baltimore, both of Baltimore, Md.
Laminated glass with each sheet having skin of resin material thereon. No. 2,022,479. James W. H. Randall, N. Y. City, to Libbey-Owens-Ford Glass Co., Toledo, Ohio.
Method treating abrasive tools used in finishing edges of laminated glass sheets. No. 2,022,530. Gerald White to Libbey-Owens-Ford Glass Co., both of Toledo, Ohio.
Production alkali resistant composition for use in production of hard tiles consisting mainly of Cumar. No. 2,022,707. Edmund Claxton and Martin K. Bare to Armstrong Cork Co., all of Lancaster, Pa.
Production moisture resistant mineral wool. No. 2,022,750. Edward A. Toohey, Somerville, N. J., to Johns-Manville Corp., N. Y. City.
Production mineral wool. No. 2,022,811. John E. Morrow, East St. Louis, Ill., and Jesse Bryte Barnitt, Pittsburgh, Pa., to Aluminum Co. of America, Pittsburgh, Pa.
Production of concrete comprising cement, sand, an aggregate, and powdered aluminum. No. 2,023,001. Karl P. Billner, N. Y. City, to Industrial Concrete, Inc., a corp. of N. J.
Glass articles provided with designs containing an artificial resin hardened insoluble, a filling agent, and a dyestuff pigment. No. 2,023,175. Alex Knelp, Frankfort-am-Main Hochst, Germany, to Winthrop Chemical Co., Inc., N. Y. City.
Production of abrasive material. No. 2,023,191. Gerhard Balle and Franz Grom, Frankfort-am-Main, and Karl Wolf, Oggersheim, Germany, to I. G., Frankfort-am-Main, Germany.
Use of heat to purify granular sand. No. 2,023,278. Rob R. McGregor, Swissvale, and Edwin W. Tillotson, Pittsburgh, Pa., to Macbeth-Evans Glass Co., Charleroi, Pa.
Production sorel-cement product by mixing emulsion of bituminous materials, separately prepared, with calcined magnesite, magnesium chloride, and a filler. No. 19,779—reissue. Hiram S. Lukens to Magnesium Cement Laboratories, Inc., both of Philadelphia, Pa.
Production of thermal insulation. No. 2,023,422. Martin C. Huggett, Evanston, Ill., to Research, Inc., Chicago.
Method treating clay or shales containing volatilizable impurities and hydrated, plastic clay substance. No. 2,023,426. Marshall Lasley, Chattanooga, Tenn.
Production shock-resisting concrete. No. 2,023,800. Wilbur Worth Williamson, Oakland, Cal., to The Pacific Lumber Co., San Francisco, Cal.
Process of treating fresh concrete. No. 2,023,887. Orla E. Hood, Indianapolis, Ind.
Marking glass by applying substance to surface comprising stannous chloride, amyl acetate, petrolatum, and hydrofluoric acid. No. 2,024,277. Theodore B. Drescher, Brighton, N. Y., to Bausch & Lomb Optical Co., Rochester, N. Y.
Process causing liquid slags and melts to set in highly porous fashion. No. 2,024,308. Carl Heinrich Schol, Allendorf (Dillkreis), Germany.
Production laminated non-splintering glass. No. 2,024,389. Archibald Renfrew, Giffnock, Scotland, to Imperial Chemical Industries, Ltd., a corp. of Great Britain.
Production ceramic flux comprising partially kaolinized pegmatite, feldspar, lime, and flint. No. 2,024,407. Joseph H. Weis, Scranton, Pa., to Feldspathic Research Corp., N. Y. City.
Covering for curing concrete. No. 2,024,727. Dozier Finley and William R. Greig, Berkeley, Cal., to The Paraffine Companies, Inc., San Francisco.
Machine for glazing glassware. No. 2,024,818. Cortland W. Davis, Alexandria, Ind., to The Mantle Lamp Co. of America, Chicago.

Industrial Chemicals, Apparatus, etc.

Production aliphatic organic acids from carbon monoxide and an aliphatic oxygen-containing compound. No. 2,021,127. Gilbert B. Carpenter to E. I. du Pont de Nemours & Co., both of Wilmington, Del.
Production of dispersions. No. 2,021,143. William S. Calcott, Pennsgrove, and Ira Williams, Woodstown, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Process raising calorific value of liquid fuel. No. 2,021,175. Alexander Classen, Aachen, Germany.
Production sulfur trioxide from acid sludge from the sulfuric acid purification of carbonaceous material. No. 2,021,372. William C. Mast, Karns City, Pa., to Chemical Construction Corp., N. Y. City.
Process removing acid from peroxide solutions using barium hydroxide and alkali. No. 2,021,384. Joseph S. Reichert, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Process reacting caustic lime with gypsum. No. 2,021,412. Chester G. Gilbert, Washington, D. C., to Parker C. Choate, Essex, Mass.
Production high strength lithopone by precipitating original crude with barium sulfide and zinc sulfate reaction. No. 2,021,420. Gustave A. Kummer, Palmerton, Pa., to The N. J. Zinc Co., N. Y. City.
Production catalytic composition comprising calcined residue of cotton saturated with various metallic salts. No. 2,021,475. Richard E. Berthold, Richmond Hill, N. Y., to Cardinal Products, Inc., a corp of N. Y.
Production of magnesium products from brine containing convertible magnesium salts. No. 2,021,501. William H. Farnsworth, Manistee, Mich., and Montel Montgomery, Los Angeles, Cal., to Marine Chemicals Co., Ltd., South San Francisco, Cal.
Production of porous articles consisting of metallic oxides. No. 2,021,520. Reinhold Reichmann, Berlin, Germany, to Siemens & Halske Aktiengesellschaft, Siemenstadt, near Berlin, Germany.
Production ethereal sulfur-containing oils. No. 2,021,539. Friedrich Boedecker, Dahlem, near Berlin, Germany.
Production of pure alumina by calcining clay and similar minerals and treating with aqueous sulfurous acid. No. 2,021,546. Wilhelm Fulda, Lautawerk, Erich Wiedbrauck, Essen, and Rudolf Reinhard Bruno Wittig, Lautawerk, Germany, to firms Vereinigte Aluminum-Werke Akteingesellschaft, Lautawerk (Lausitz), Germany, and Th. Goldschmidt A. G., Essen (Ruhr), Germany.
Removing sulfur dioxide from flue gases by treating with acid iron sulfate solution and then with alkaline suspension of iron hydroxide. No. 2,021,548. Charles Frederick Goodeve, London, England.
Process improving taste of hydrogenated oils. No. 2,021,552. Dietrich Hildisch, Oslo, Norway.
Recovering sulfur dioxide gas in highly concentrated form from mixed gas containing sulfur dioxide. No. 2,021,558. Frederick Eric Lee, Robert Lepsoe, and Francis Herbert Chapman, Trail, British Columbia, Canada, to The Consolidated Mining & Smelting Co. of Canada, Ltd., Montreal, Quebec, Canada.
Continuous production of alcohols by reacting water and alkylene hydrocarbon in presence of acid catalyst. No. 2,021,564. Floyd J. Metzger to Air Reduction Co., Inc., both of N. Y. City.
Production pure aluminum-alkali-double fluorides by treating crude with hydrofluoric acid and using alkali salt to separating aluminum from iron and silicon. No. 2,021,601. Friedrich Walter Hilscher, Wimpfen-am-Neckar, and Veit Schwemmer, Ottensoos, near Nuremburg, Germany, to Saline Ludwigshalle, Wimpfen-am-Neckar, Germany.
Method and apparatus introducing reagents into liquid suspensions. No. 2,021,616. Kenneth E. Stuart, Merion, Pa., to Hooker Electrochemical Co., N. Y. City.
Method treating limestone containing fluorine by process of heating. No. 2,021,663. William H. Knox, Jr., Nashville, Tenn., to Victor Chemical Works, Chicago Heights, Ill.
Production alkali metal phosphates. No. 2,021,699. Louis Preisman, Wilmington, Del., to General Chemical Co., N. Y. City.
Precipitation of naturally occurring proteinaceous matter by chlorine. No. 2,021,712. Stefan Ansbacher, George E. Flanigan, and George C. Supplee, Bainbridge, N. Y., to The Borden Co., N. Y. City.
Production sulfur dioxide gas by burning sulfur containing material. No. 2,021,725. Ingenuin Hechenbleikner to Chemical Construction Corp., both of Charlotte, N. C.
Production hydrated ferric chloride by reacting iron with water and chlorine. No. 2,021,791. Edward Thorndike Ladd, Lewiston Heights, N. Y., to Isco Chemical Co., Inc., Niagara Falls, N. Y.
Process converting hydrogen sulfide into sulfur. No. 2,021,865. Bert H. Lincoln to Continental Oil Co., both of Ponca City, Okla.
Method treating solutions containing free sulfuric and ferrous sulfate by mixing with an iron oxide. No. 2,021,867. Thomas C. Oliver, Great Neck, and Samuel F. Spangler, Scarsdale, N. Y., to Chemical Construction Corp., N. Y. City.
Production anhydrous calcium sulfate in finely divided and anhydrous form by treating hydrates with sulfuric acid. No. 2,021,910. Sydney Francis William Crundall to Peter Spence & Sons, Ltd., both of Manchester, England.
Process for wax treatment by heating with dry mixture of caustic potash and caustic soda. No. 2,021,926. Wilfred Archibald Sexton, Huddersfield, and Denis Ward, Crumpsall, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.
Removal sulfur dioxide from flue gases using free oxygen with solution containing ferric and manganese ions. No. 2,021,936. Henry F. Johnstone to Board of Trustees of the University of Illinois, both of Urbana, Ill.
Removing sulfur dioxide and other impurities from flue gases. No. 2,021,937. Henry F. Johnstone to Board of Trustees of the University of Illinois, both of Urbana, Ill.
Production light, cellular aggregate. No. 2,021,956. Andrew L. Gladney; one-half to Marshall S. Hanrahan, both of San Francisco, Cal.
Production of pure lithium compounds from impure solutions which contain also sodium and potassium. No. 2,021,986. Henry Seymour Colton, Shaker Heights, Ohio, to The Grasselli Chemical Co., Cleveland, Ohio.
Recovery of values from lithium bearing ores. No. 2,021,987. Henry Seymour Colton, Shaker Heights, Ohio, to The Grasselli Chemical Co., Cleveland, Ohio.
Production of pure lithium compounds from impure solution. No. 2,021,988. Harry P. Corson, Lakewood, and Robert Pfanstiel, Cleveland Heights, Ohio, to The Grasselli Chemical Co., Cleveland, Ohio.
Recovery of lithium values from lithium bearing ores. No. 2,022,003. Raymond J. Kepfer, Lakewood, and Robert Pfanstiel, Cleveland Heights, Ohio, to The Grasselli Chemical Co., Cleveland, Ohio.
Manufacture of alums by heating alum-forming trivalent metal, silica, and a basic substance. No. 2,022,012. Svend S. Svendsen, Chicago, Ill., to Clay Reduction Co., a corp. of Ill.
Production substantially anhydrous caustic from aqueous solution by contacting solution with anhydrous caustic and then vaporizing. No. 2,022,037. Arnold Hanchett to The Solvay Process Co., both of Syracuse, N. Y.
Process recovering non-sugars from saccharine materials. No. 2,022,-093. Gustave T. Reich, Philadelphia.
Removing impurities from stream of hydrogen by liquefying and freezing out impurities. No. 2,022,165. Lee S. Twomey, Vista, Cal.
Production of aqueous bituminous emulsions. No. 2,022,229. Ulric B. Bray, Palos Verdes Estates, and Lawton B. Beckwith, San Pedro, Cal., to Union Oil Co. of Cal., Los Angeles, Cal.
Synthesis of organic aliphatic acids by reacting in liquid phase olefinic hydrocarbon, carbon monoxide, and water. No. 2,022,244. Alfred T. Larson to E. L. du Pont de Nemours & Co., both of Wilmington, Del.
Process for refining crude alkyl phenols. No. 2,022,256. Reuben Schuler, Elizabeth, N. J., to Stanco Inc.
Method drying alcohols and esters with concentrated aqueous solution of caustic alkali. No. 2,022,274. Benjamin T. Brooks, Greenwich, Conn., to Standard Alcohol Co., Wilmington, Del.
Production of olefines and liquid hydrocarbons from methane. No. 2,022,279. Paul Feiler, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.
Production refined hydrogenated sesame oil. No. 2,022,361. Guy W. Phelps and Raymond Bradley to Industrial Patents Corp., all of Chicago.
Sulfite pulp digester composed of steel shell with sprayed lining of a corrosion resisting metal. No. 2,022,378. Paul B. Lacy, Edwin F. Libby, and Ralph V. Metz, Covington, Va., to Industrial Chemical Sales Co., Inc., N. Y. City.
Printing apparatus for transferring bichrome or trichrome pictures to lenticulated films. No. 2,022,432. Armand Rodde and Albert Henri Herault, Paris, Victor Hudeley, Clichy, and Jean Lagrave, Paris, France.
Production fatty esters of mono and di-glycerides. No. 2,022,493. Carl W. Christensen to Armour & Co., both of Chicago.
Production fatty esters of mono and di-glycerides. No. 2,022,494. Carl W. Christensen to Armour & Co., both of Chicago.
Production dichlor derivatives of ethylene hydrocarbons by reacting ethylene with chlorine in presence of mixture of trichlor and tetrachlor propanes and butanes. No. 2,022,616. Meyer Berlinger, Edgemere, N. Y., to The Texas Co., N. Y. City.
Production halogenated diphenyl oxide. No. 2,022,634. Edgar C. Britton, Wesley C. Stoesser, and Gerald G. Goergen to The Dow Chemical Co., all of Midland, Mich.
Synthesis of hydrogen peroxide by introducing oxygen and hydrogen at

high velocity into silent electric discharge. No. 2,022,650. Lynn H. Dawsey, New Orleans, La.

Process rendering water-soluble compounds soluble in organic solvents and substantially water insoluble. No. 2,022,678. Wolf Kritchevsky, Carl J. Beckert, and Jack Braver, Chicago.

Apparatus for producing solid carbon dioxide. No. 2,022,705. Harlon A. Bullock, Kansas City, Mo.

Production stable colloidal solution of iodine by agitating free iodine with alpha amylose and starch residues. No. 2,022,729. William M. Malisoff to Mackie-Henkels, Inc., both of Philadelphia.

Bleaching of fatty acids, oils and fats using calcium hypochlorite solution. No. 2,022,738. Balthaser E. Reuter to The Mathieson Alkali Works, both of N. Y. City.

Production chemical composition comprising ester of a polyglycerol and high molecular weight fatty acid. No. 2,022,766. Benjamin R. Harris, Chicago.

Apparatus for conversion of hydrocarbons into gas mixtures of carbon monoxide and hydrogen. No. 2,022,778. Charles G. Maier, Berkeley, Cal., to Thomas B. Swift.

Production free flowing powdered sulfur. No. 2,022,796. Ferd W. Wieder, Berkeley, Cal., to San Francisco Sulfur Co., a corp. of Cal.

Production ammonium sulfate from acid sludge by neutralization of sludge with ammonia. No. 2,022,813. Jan D. Ruys, Pittsburgh, Cal., to Shell Development Co., San Francisco, Cal.

Process recovering non-sugars from saccharine materials. No. 2,022,-824. Gustave T. Reich, Philadelphia.

Production aqueous hydrogen peroxide solution stabilized with antipyrine. No. 2,022,860. Albert Kunz, Naples, Italy.

Production high molecular alcohols and unsaturated hydrocarbons. No. 2,022,894. Walter H. McAllister, Wyoming, Ohio, to The Procter & Gamble Co., Cincinnati, Ohio.

Production formic acid from gaseous mixture of carbon monoxide and steam, using catalyst of phosphoric, arsenic, tungstic group. No. 2,023,-003. Gilbert B. Carpenter, Bellemoor, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production bituminous paving mixture by coating a mineral aggregate with bituminous material and adding powdered aluminum stearate to separate coated particles. No. 2,023,068. Walter H. Flood, Chicago.

Production nitrogen containing esters. No. 2,023,075. Benjamin R. Harris, Chicago.

Fermentation process for production of butyl alcohol. No. 2,023,087. Winfred N. McCutchan and Cornelius F. Arzberger, Peoria, Ill., to Commercial Solvents Corp., Terre Haute, Ind.

Method and apparatus for determining molecular weights of gases or vapors. No. 2,023,164. Hamilton P. Cady, Lawrence, Kans.

Process for treatment of liquids with ammonia. No. 2,023,199. Edward W. Harvey, Highland Park, N. J., to The Barrett Co., N. Y. City.

Production sulfuric acid by effecting a gas phase exothermic catalytic reaction in several stages. No. 2,023,203. Henry F. Merriam, West Orange, N. J., to General Chemical Co., N. Y. City.

Reduction of contamination by iron in 42 to 54% caustic soda solutions. No. 2,023,271. Albert H. Hooker, Lewiston, N. Y., to Hooker Electrochemical Co., N. Y. City.

Production butyl alcohol by fermentation process. No. 2,023,368. David A. Legg to Commercial Solvents Corp., both of Terre Haute, Ind.

Production butyl-acetone by fermentation process. No. 2,023,374. Hugh R. Stiles to Commercial Solvents Corp., both of Terre Haute, Ind.

Production high molecular weight alcohols using a hydrogenation catalyst of metal, a salt of palmitic, stearic, etc., and hydrogenating. No. 2,023,383. Walther Schrauth, Berlin-Dahlem, and Theodor Bottler, Rodleben B. Rosslau, Germany, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.

Production casein solution composition. No. 2,023,389. Carl Iddings, Staten Island, N. Y., to The Muralo Co., Inc., a corp. of N. Y.

Method of electrocleaning surfaces. No. 19,773—reissue. Thomas E. Dunn, Bridgeport, Conn., to The Bullard Co., a corp. of Conn.

Chemical apportioning method and apparatus. No. 2,023,552. Henry J. Savage, Ridgewood, N. J.

Process and apparatus for promoting chemical reactions in the electrical discharge. No. 2,023,637. Robert V. Kleinschmidt, Arlington, Mass., to Arthur D. Little, Inc., Cambridge, Mass.

Production road covering surface. No. 2,023,688. Bernard William Deacon Lacey, Ward End, Birmingham, and Percy John Bawcutt, Yardley, Birmingham, England, to Dunlop Rubber Co. Ltd., London, England.

Production non-corrosive aqueous solution of an alcohol containing reaction product of triethanolamine and blown castor oil. No. 2,023,755. Frederick A. Weihe, Jr., to McAleer Mfg. Co., both of Detroit, Mich.

Production derivative from drying oils by reacting drying oil with water-soluble sulfurous acid salt in presence gaseous oxidizing agent. No. 2,023,768. Karl Ott, Leverkusen-am-Rhine, Herbert Gensel, Cologne-Mulheim, and Heribert Schussler, Cologne-Duetz, Germany, to I. G., Frankfort-am-Main, Germany.

Primary cell using depolarizer and a caustic alkaline solution as electrolyte with zirconium oxide in the electrolyte. No. 2,023,815. Martin L. Martus, Woodbury, and Edmund H. Becker, Waterbury, Conn.

Production ether derivative of morpholine alcohols. No. 2,023,872. Henry L. Cox and Thomas F. Carruthers, South Charleston, W. Va., to Carbide & Carbon Chemicals Corp., a corp. of N. Y.

Process and apparatus for effecting reactions between solids and gases. No. 2,023,942. Ernest Wescott, Niagara Falls, N. Y., to Sulphide Corp., a corp. of Del.

Production antimony trifluoride by converting antimony trichloride with hydrofluoric acid. No. 2,024,008. Thomas Midgley, Jr., Worthington, Albert L. Henne, Columbus, and Robert R. McNary, Dayton, Ohio, to General Motors Corp., a corp. of Del.

Process recovering lithia from amblygonite and similar aluminum phosphate minerals. No. 2,024,026. John Harry Coleman and Ned E. Jaffa, Elizabeth, N. J., to The Warner Chemical Co., N. Y. City.

Production alkali and alkaline earth salts of sugar phosphoric acid esters. No. 2,024,036. Seigo Funaoka, Kuramada-cho, Sakyo-ku, Kyoto-shi, Japan.

Catalytic process of polymerizing oil and polymerization accelerator therefor. No. 2,024,103. Wilhelm Krumbhaar to Beck, Koller & Co., Inc., both of Detroit, Mich.

Method forming finely divided materials into pellets. No. 2,024,176. Thorne E. Lloyd, Netcong, N. J., to Dwight & Lloyd Sintering Co., Inc., N. Y. City.

Production anhydrous magnesium chloride by electrolytic means. No. 2,024,242. Wilhelm Moschel, Bitterfeld, Germany, to Magnesium Development Corp., a corp. of Del.

Production potassium nitrate by cooling saturated solution and separating potassium nitrate salts. No. 2,024,370. Oskar Kaselitz, Berlin, Germany.

Method freeing gases from sulfur compounds. No. 2,024,393. Walther Sexauer to Gastechnick G. m. b. H., both of Oberhausen, Germany.

Production lecithin from vegetable raw materials, product being substantially free from bitter taste. No. 2,024,398. Samuel O. Sorensen and George F. Beal, Minneapolis, Minn., to American Lecithin Co., a corp. of Ohio.

Process securing sulfur dioxide extract of petroleum. No. 2,024,476. John T. Rutherford, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco.

Production lactic acid by reacting a carbohydrate with a strong alkali. No. 2,024,565. Geza Braun to Standard Brands, Inc., both of N. Y. City.

Production sodium carbonate decahydrate. No. 2,024,679. George Lewis Cunningham, Niagara Falls, N. Y., to The Mathieson Alkali Works, Inc., N. Y. City.

Apparatus for production of ammonium chloride. No. 2,024,680. Elam C. Curtis, Niagara Falls, N. Y., to The Mathieson Alkali Works, Inc., N. Y. City.

Method of well-treatment using agent to lower surface tension and an acid to form water-soluble salts. No. 2,024,718. Leonard C. Chamberlain to The Dow Chemical Co., both of Midland, Mich.

Production halogenated aliphatic higher ethers by reacting alpha halogenated ether with compound containing a olefinic linkage. No. 2,024,-749. Norman D. Scott, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Production of masses and articles having porous cellular structure. No. 2,024,791. Gustav Adolph Munich, and Theodor Pohl, Frankfort-am-Main, Germany, to Leichtbaustoff-Gesellschaft m. b. H., Frankfort-am-Main, Germany.

Production xanthates by reacting carbon bisulfide and anhydrous alkali metal alcoholate. No. 2,024,923. Wilhelm Hirschkind, Berkeley, Cal., to Great Western Electro-Chemical Co., San Francisco.

Production xanthates comprising an alkali metal furfuryl xanthate containing an unhydrated desiccant. No. 2,024,924. Wilhelm Hirschkind, Berkeley, William D. Ramage, Pittsburgh, and Harry Bender, Concord, Cal., to Great Western Electro-Chemical Co., San Francisco.

Production xanthates. No. 2,024,925. Wilhelm Hirschkind, Berkeley, Cal., to Great Western Electro-Chemical Co., a corp. of Cal.

Apparatus for removing objectionable odors from gases using activated carbon. No. 19,791—reissue. Arthur B. Ray, Bayside, N. Y., to National Carbon Co., Inc., a corp. of N. Y.

Leather and Tanning

Printing and tanning of gelatinous layers. No. 2,023,669. Valentin Dietz, Cologne, Germany, to Erwin B. Elliott and Maurice C. Boyd, both of Miami, Fla.

Production manufactured gelatin from pigskins. No. 2,024,683. Chester H. Epstin, Highland Park, and Nathan R. Gotthoffer, Grayslake, Ill., to Grayslake Gelatin Co., Grayslake, Ill.

Metals, Alloys, Ores

Method increasing carbon content in iron. No. 2,021,159. Theodore Tafel, Jr. to Marie C. Tafel, both of Ben Avon, Pa.

Method of resistance welding aluminum and aluminum base alloys provided with anodically produced oxide coating. No. 2,021,477. Donald I. Bohn to Aluminum Co. of America, both of Pittsburgh, Pa.

Method preventing corrosion of metallic surfaces. No. 2,021,519. Herbert Spencer Polin, Port Washington, N. Y., to Polin, Inc., N. Y. City.

Production hard, unmelted composition for steel cutting tools, dies, etc. No. 2,021,576. Philip M. McKenna, Unity Township, Westmoreland County, Pa., to Vanadium-Alloys Steel Co., Latrobe, Pa.

Method brightening metals electronegative to iron using bath containing chromic acid and a sulfate radical. No. 2,021,592. George Dubpernell, Ann Arbor, and Karl Gustaf Soderberg, Detroit, Mich., to Udylite Process Co., Detroit.

Arc welding electrode comprising ferrous metal core covered with carbonaceous material. No. 2,021,628. Louis J. Larson to A. O. Smith Corp., both of Milwaukee, Wis.

Production alloy steel containing carbon, chromium, manganese, silicon, and tungsten. No. 2,021,781. Walter G. Hildorf, Canton, Ohio, and Albert E. White and Claude L. Clark, Ann Arbor, Mich., to The Timken Roller Bearing Co., Canton, Ohio.

Production alloy steel containing carbon, chromium, manganese, silicon, and tungsten. No. 2,021,782. Walter G. Hildorf, Canton, Ohio, and Albert E. White and Claude L. Clark, Ann Arbor, Mich., to The Timken Roller Bearing Co., Canton, Ohio.

Production alloy steel containing carbon, chromium, manganese, silicon, and tungsten. No. 2,021,783. Walter G. Hildorf, Canton, Ohio, and Albert E. White and Claude L. Clark, Ann Arbor, Mich., to The Timken Roller Bearing Co., Canton, Ohio.

Metal edged, precast slab for building construction. No. 2,021,922. Robert H. Peck, West New Brighton, N. Y., to Amercian Cyanamid & Chemical Corp., a corp. of Del.

Formation of drill billets using a manganese-nickel welding alloy. No. 2,021,945. Burt Howell Payne, Westfield, N. J., to Stulz-Sickles Co., Newark, N. J.

Production of nitrogen containing rustless iron and steel. No. 2,021,-979. William Bell Arness to Rustless Iron Corp. of America, both of Baltimore, Md.

Production of substantially pure magnesium by liberation of magnesium vapor. No. 2,022,282. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Low carbon steel welding rod containing titanium, and vanadium in small amounts. No. 2,022,307. John B. Austin, Cleveland, Ohio, to Una Welding, Inc., East Cleveland, Ohio.

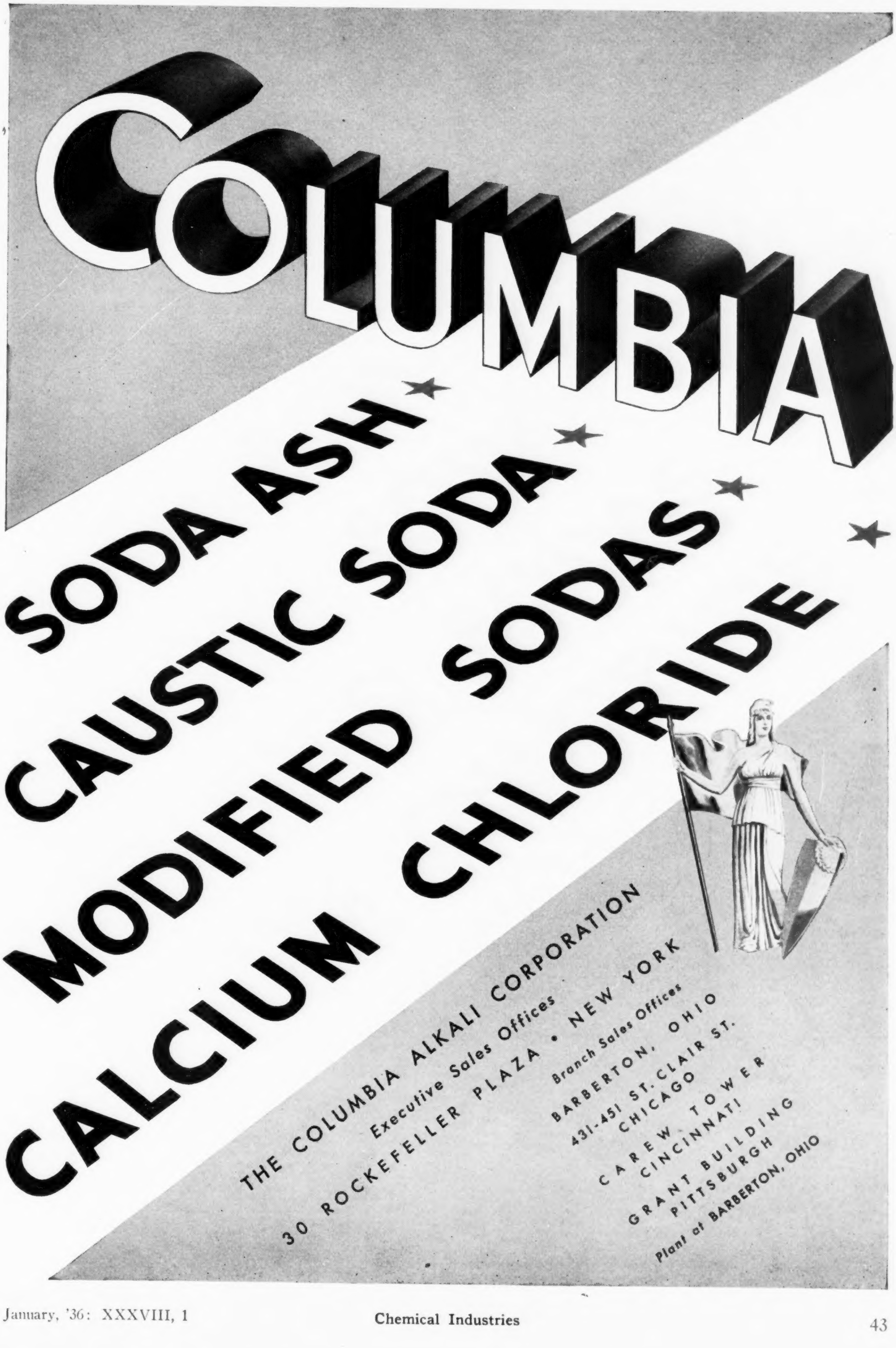
Manufacture of beryllium or its alloys by electrolytic means. No. 2,022,404. Harry C. Claflin, Marysville, Mich., to The Beryllium Corp., N. Y. City.

Welding rod alloy comprising mainly copper and zinc with smaller amounts, silicon, manganese, iron, boron, and tin. No. 2,022,439. William Wetzel Sieg, Bellefonte, Pa.

Production bimetallic strips. No. 2,022,571. John V. O. Palm and George S. Salzman, Cleveland Heights, Ohio, to The Cleveland Graphite Bronze Co., Cleveland, Ohio.

Production aluminum alloy casting, magnesium free, and containing copper, alloy being cast without artificial aging. No. 2,022,686. Joseph A. Nock, Jr., Tarentum, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Production ferrous article coated with hot zinc and covered with second coat of electro-deposited cadmium. No. 2,023,364. Frederick M. Crapo to Indiana Steel & Wire Co., both of Muncie, Ind.


COLUMBIA
SODA ASH ★
CAUSTIC SODA ★
MODIFIED SODAS ★
CALCIUM CHLORIDE ★
THE COLUMBIA ALKALI CORPORATION
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431-451 ST. CLAIR ST.
CHICAGO
CAREW TOWER
CINCINNATI
GRANT BUILDING
PITTSBURGH
Plant at BARBERTON, OHIO

Production rolling extruded magnesium alloy. No. 2,023,366. John E. Hoy to The Dow Chemical Co., both of Midland, Mich.
Production sponge iron. No. 19,770—reissue. William Darke Brown, Pittsburgh, Pa.
Production hard metal alloy of cobalt, tungsten, and chromium, containing titanium carbide and another hard metal carbide. No. 2,023,413. Bruno Fetkenheuer, deceased, late of Berlin-Siemensstadt, by Helene Fetkenheuer, nee Jurgens, administratrix, Berlin-Siemensstadt, Germany, to Deutsche Edelstahlwerke Akteingesellschaft, Crefeld, Germany.
Method treating alloy containing copper and zinc to obtain separate products. No. 2,023,424. Frederick Laist, Scarsdale, N. Y., to Anaconda Copper Mining Co., N. Y. City.
Production composite wrought forms consisting of magnesium alloys in integrally joined layers. No. 2,023,498. Arthur W. Winston to The Dow Chemical Co., both of Midland, Mich.
Production duplex aluminous articles. No. 2,023,512. Robert H. Brown, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.
Production zinc base alloy die coated by successive treatment with nitric acid, caustic soda, and antimony oxide. No. 2,023,645. William G. Newton and Howard E. Christie, New Haven, Conn., to William G. Newton.
Method alloying an alkaline metal with a core material by disposing and heating a metallic core in atmosphere of gaseous compound of the alkaline metal. No. 2,023,707. Hans J. Spanner, Berlin, Germany, and Ulrich Doering, N. Y. City, to Electrons, Inc., a corp. of Del.
Production heat-treated coiled medium or high carbon steel wire rods. No. 2,023,736. Henry David Llewellyn Lloyd, Stretton, near Warrington, England, to The Whitecross Co., Ltd., Warrington, England.
Coated steel electrode for arc welding. No. 2,023,818. Fritz Muller, Furstenwalde, Germany, to N. V. Machinerieen-en Apparaten Fabrieken "Meaf," Utrecht, Netherlands.
Production composite ferrous articles. No. 2,023,908. Max R. Trembour, Beaver, Pa., to Jessop Steel Co., Washington, Pa.
Method of casting phosphorized copper. No. 2,023,957. Russell Hewgill, Sudbury, Ontario, Canada, to The American Metal Co., Ltd., N. Y. City.
Process for heat treatment of malleable iron castings. No. 2,024,014. Cyril Stanley Smith, Cheshire, Conn., to Battelle Memorial Institute, Columbus, Ohio.
Process introducing steel-forming additions into the aluminogenetic iron in aluminothermal welding. No. 2,024,132. Wilhelm Sander to firm Th. Goldschmidt A.-G., both of Essen-am-Ruhr, Germany.
Method heat treating ferritic steels containing chromium, carbon, and titanium. No. 2,024,561. Frederick M. Becket, N. Y. City, and Russell Franks, Jackson Heights, N. Y., to Electro Metallurgical Co., a corp. of W. Va.
Treatment of aluminum and its alloys to prevent formation of blisters. No. 2,024,751. Philip T. Stroup, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa.
Composite welding rod comprising ferrous core with coating of flux material. No. 2,024,992. William A. Wissler and Wilber B. Miller, Niagara Falls, N. Y., to Haynes Stellite Co., a corp. of Ind.

Naval Stores

Process treating wood rosin to produce rosin drying oil. No. 2,022,973. Robert C. Palmer and Paul O. Powers, Pensacola, Fla., to Newport Industries, Inc., Milwaukee, Wis.

Paper and Pulp

Production paper impervious to water or grease by coating with oil soluble phenol-formaldehyde compound and casein. No. 2,021,172. Edmond H. Bucy, Waukegan, Ill., to Atlas Powder Co., North Chicago, Ill.
Production paper sizing. No. 2,022,004. Louis Leonard Larson to E. I. du Pont de Nemours & Co., both of Wilmington, Del.
Preparation of pulps containing hard binder substances. No. 2,022,311. Harry C. Fisher, Cincinnati, Ohio, to The Richardson Co., Lockland, Ohio.
Production material containing parchmentized paper. No. 2,023,711. Ervin E. Strawn to Paterson Parchment Paper Co., both of Passiac, N. J.
Apparatus for treatment of paper. No. 2,024,248. Harold Robert Rafton, Andover, Mass., to Raffold Process Corp., a corp. of Mass.
Method treating wood by exposing smooth surfaces to selective swelling reagent. No. 2,024,257. Marjorie G. Snelling, Allentown, Pa.

Rubber*

Production substantially uncoagulated aqueous rubber—containing compositions by mixing rubber dispersion with aqueous emulsion of rubber solvent. No. 2,018,313. Edward Arthur Murphy, Erdington, Birmingham, Frank Theodore Purkis, Moseley, and Douglas Frank Twiss, Wylde Green, England, to Dunlop Rubber Co., Ltd., Erdington, Birmingham, England.
Manufacture rubber article having wrinkled surface by coating a form with latex and chemically coagulating the coating, then applying swelling agent. No. 2,018,508. Arthur E. Barnard, Waterbury, Conn., to U. S. Rubber Co., N. Y. City.
Method plasticizing rubber by subjecting unvulcanized rubber to action of unsymmetrically substituted hydrazine. No. 2,018,643. Ira Williams, Woodstown, and Carroll Cummings Smith, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Production plastic rubber products. No. 2,018,644. Ira Williams, Woodstown, and Carroll Cummings Smith, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Production rubber cement of high rubber content and low viscosity. No. 2,018,645. Ira Williams, Woodstown, and Carroll Cummings Smith, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Isomerization of rubber by dissolving in inert organic solvent and adding anhydrous hydrofluoric acid. No. 2,018,678. Walter Eastby Lawson, Woodbury, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.
Preparing granulated rubber from rubber latex by use of insolubilizable hydrophilic stabilizer. No. 2,019,055. Royce J. Noble, Malden, Mass., to Heveatex Corp., Melrose, Mass.
Vulcanized rubber solution by depolymerization of rubber. No. 2,019,207. Walter Alexander, Hamburg, Germany.
Production compositions from mixtures of aqueous rubber material dispersions, cement, and a hydrophilic colloid. No. 2,019,239. Douglas Frank Twiss, Wylde Green, Birmingham, and Eric William Bower Owen, Walmley, Birmingham, England, to Dunlop Rubber Co. Ltd., London, England.
Production sponge rubber using mixture of rubber, a blowing agent, vulcanizing agent, and an accelerator. No. 2,019,489. Charles F. Flemming to Roth Rubber Co., both of Cicero, Ill.
Apparatus forming threads or filaments from aqueous rubber dispersions or the like. No. 2,019,543. Edward Arthur Murphy, Wylde Green, Birmingham, England, to Dunlop Rubber Co. Ltd., London, England.
Production furoyl substituted mercaptobenzothiazoles for use as vulcanization accelerator by reacting furoyl halide and mercaptoarylthiazole. No. 2,020,051. Sylvester M. Evans, Nitro, W. Va., to The Rubber Service Laboratories Co., Akron, Ohio.
Production chlorinated rubber by adding alkaline hypochlorites to finally precipitated rubber chloride. No. 2,020,076. Eugen Mollney, Ammendorf, Germany, to firm Chemische Fabrik Buckau, Ammendorf (Saalkreis), Germany.
Method preserving rubber by treatment with an aryl naphthylamine. No. 2,020,291. Albert M. Clifford, Stow, Ohio, to Wingfoot Corp., Wilmington, Del.
Production manufactured articles containing sponge or cellular rubber. No. 2,020,994. Wilfred Henry Chapman, Stechford, Birmingham, Eric William Bower Owen, Erdington, Birmingham, and Donald Whitworth Pounder, Moseley, Birmingham, England, to Dunlop Rubber Co. Ltd., London, England.
Process for devulcanizing rubber. No. 2,021,046. Charles H. Campbell, Kent, Ohio.
Production impression material containing resilient vulcanized rubber filaments distributed in organic hydrocolloid gel base and balata-like thermoplastic material. No. 2,021,059. Laurence E. Harrison, Long Beach, Cal., to Oramold Products Corp., West Hollywood, Cal.
Production resin-rubber composition. No. 2,021,063. John Patrick Henharen, Durban, Union of South Africa.

Textile, Rayon*

Conversion vegetable fibers into substance resembling wool by using oxidizing treatment, then crinkling with caustic solution. No. 2,018,276. Ralph H. McKee, Jersey City, and Earle H. Morse, Nutley, N. J.
Method weatherproofing textile insulated conductors by impregnating with heated asphalt compound and coating with liquid wax and anti-sticking material. No. 2,018,404. Leslie F. Lamplough, Baltimore, Md., and Curtis E. Plass, East Orange, N. J., to Western Electric Co., N. Y. City.
Production stripping agent for textile materials. No. 2,019,124. John Gwynant Evans and Leslie Gordon Lawrie, Blackley, Manchester, England, to Imperial Chemical Industries Ltd., a corp. of Great Britain.
Process for making durable wool like artificial silk. No. 2,019,183. Georges Heberlein, Wattwil, Switzerland, to Heberlein Patent Corp., N. Y. City.
Production artificial fiber material. No. 2,019,185. Rudolph H. Kagi, Grantwood, N. J., to Heberlein Patent Corp., N. Y. City.
Process facilitating penetration of latex into textile materials. No. 2,019,420. Leon Sylvain Max Lejeune, Wasquehal, and Jean Etienne Charles Bongrand, Paris, France.
Process varnishing fabrics, leather, etc. No. 2,019,531. Giacomo Galimberti and Giuseppe Peverelli, Milan, Italy.
Process coloring textile materials containing organic cellulose derivatives. No. 2,019,626. Henry Charles Olpin and George Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.
Process coloring cellulose acetate materials. No. 2,019,627. Henry Charles Olpin and George Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.
Process moistureproofing thin, flexible, transparent cellulose acetate sheeting by first coating with gum, then coating with wax. No. 2,019,648. Norman F. Beach and James G. McNally to Eastman Kodak Co., all of Rochester, N. Y.
Process and apparatus for treatment of artificial silk. No. 2,020,057. August Hartmann, Berlin-Lichterfelde, Walter Hoefinghoff, Hohenlimburg Obernahmer, and Karl Meyer-Gaus, Wuppertal-Elberfeld-Ronsdorf, Germany, to American Bemberg Corp., N. Y. City.
Method treating articles of wood such as spools or bobbins by impregnating with liquid varnish resin. No. 2,020,172. Louis M. Cotchett, Brookline, Mass., to Textile Patent & Process Co., Inc., Boston, Mass.
Production textile material. No. 2,020,303. Henry Dreyfus, London, England.
Production highly twisted crepe threads from yarns of cellulose ester material by treating with acid radicle—containing solution. No. 2,020,304. Henry Dreyfus, London, and William Alexander Dickie and Robert Wighton Moncrieff, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.
Production assistants for textile and related industries. No. 2,020,453. Hans Beller, Ludwigshafen-am-Rhine, and Hermann Schuette, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.
Treatment cellulose textile materials using water and vegetable lecithin. No. 2,020,517. Bruno Rewald, Hamburg, Germany, to American Lecithin Co., Cleveland, Ohio.
Process for dyeing organic textile materials. No. 2,020,675. George Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, a corp. of Del.

Water, Sewage Treatment

Sludge digesting tank for sewerage. No. 2,023,295. Henry L. Thackwell, Jacksonville, Tex., to The Dorr Co., Inc., N. Y. City.
Production industrial water composition in form of non-corrosive emulsion. No. 2,023,367. Karl Krekeler, Hamburg, Germany, to Shell Development Co., San Francisco, Cal.
Aeration method in treatment of waters and sewage. No. 2,024,345. Henry E. Elrod, Houston, Tex.
Production non-caking metaphosphate for water softening for water softening or detergent purposes. No. 2,024,543. George W. Smith to Hall Laboratories, Inc., both of Pittsburgh, Pa.

* *Patents for Rubber and Textiles include issues Oct. 22 through Nov. 12 inclusive.*

Chemical Refining of Petroleum

Summary of Products and Processes For New Lubricants

By W. R. Wiggins and F. C. Hall

INTRODUCTION of solvent refining methods in lubricating oil manufacture is due largely to developments in automobiles and aircraft. Increasing efficiency of internal-combustion engines with concurrent increase in bearing pressures, speeds and temperatures, calls for lubricating oils of particularly high resistance to sludging, low pour point, low viscosity change with temperature, and minimum carbon deposition in service. Oils produced by conventional refining methods from available crudes are not wholly satisfactory, and blending effects a compromise.

Bettering High Grade Pennsylvania Oil

By solvent refining, it is possible to produce from widely differing lubricating oil stocks, oils having viscosity indices and oxidation stability equivalent to, or exceeding, those of Pennsylvanian origin, while retaining the low carbon-forming characteristics of naphthene base distillates. Solvent extraction separates to a varying degree the high- and low-grade components of a lubricating stock, and cannot, therefore, produce more high-grade oil from it than is present in the original. In extremely naphthenic oils, yield of high-grade material is low, but because of the flexibility of the process, the yield can be increased to any required extent at the expense of quality. Low-grade components separated are available for cracking stock or in certain cases for asphalt.

Hydrocarbons present in lubricating oil stocks may be divided into 2 classes: "paraffinic" constituents of predominantly open-chain structure and "naphthenic" components which appear to be cyclic compounds of high carbon-hydrogen ratio. These terms serve to differentiate, broadly, between those constituents of lubricating oils having satisfactory physical and chemical properties, such as high viscosity index, low viscosity-gravity constant, and high oxidation stability, and the naphthenic constituents which are inferior in these respects. Distillation processes effect separation of hydrocarbons on the basis of boiling point, or molecular weight, and do not otherwise differentiate between chemical classes. Such separation may be effected by solvent extraction processes.

Selective Solvents Defined

Selective solvents used are compounds which when mixed with the lubricating stock at a suitable temperature form 2 liquid phases. Naphthenic constituents are more soluble, and hence are concentrated in the solvent phase, while the less soluble paraffinic compounds, with dissolved solvent, form the 2nd phase. Oil obtained from the solvent phase is termed the extract, and that from the hydrocarbon phase the raffinate.

Solvent-oil ratio used is dependent on the selectivity and solvent power of the solvent; selectivity diminishes with increasing temperature, while solvent power increases. For a given solvent and extraction system the solvent-oil ratio will vary according to the type of oil processed, and the yield and characteristics of the raffinate required. Method of extraction used influences the efficiency of the process, and thus the amount of solvent necessary. Highest efficiency is offered by multiple-stage counter-current, or packed tower continuous counter-current extraction.

For efficient extraction temperature employed must be such as to secure a satisfactory balance between selectivity and solvent power. It is dependent on both the solvent used and stock treated, paraffin base residuals requiring a higher temperature than naphthenic distillate stocks.

The raffinate obtained from a given stock in general exhibits lower specific gravity, viscosity-gravity constant, and viscosity, with higher viscosity index, reduced carbon residue and considerably improved oxidation resistance. Color is improved with resultant reduction in the finishing treatment required for marketable products, while in sulfur-containing stocks the sulfur content is considerably reduced. Many solvents have been investigated for the selective extraction of lubricating oil stocks, but only a limited number have been utilized commercially. More important of these are discussed in the following section.

Sulfur Dioxide-Benzol Mixtures

Application of liquid sulfur dioxide as a solvent agent originated in the Edeleanu process for the removal of aromatic, unsaturated and sulfur-containing constituents of kerosene. A natural development followed in the utilization of this process for light lubricating oils. Operating costs for the treatment of kerosene and light oils by this process have been estimated to be of the order of 8 to 10c per bbl. of stock. Sulfur content of the raffinate is considerably lower than that of the original stock, but further solvent treatment results in a smaller decrease of the residual sulfur compounds.

At low temperatures, sulfur dioxide shows reduced efficiency in the extraction of heavy oils, this being largely due to the low solubility of the higher-molecular-weight naphthenic components. By increasing the temperature of extraction the solvent power is increased without undue loss of selectivity, enabling heavier stocks to be successfully treated. A further method of increasing the solvent power is offered by the use of benzol in conjunction with liquid sulfur dioxide. By variation in the proportions of the 2 solvents used, a high degree of flexibility is obtained, allowing a wide range of lubricating stocks to be treated.

Original plant using phenol has been in operation since '30, and other plants have been installed subsequently. Operation consists of counterflow mixing of oil and solvent through a series of 7 mixers and corresponding settling tanks. Stock and solvent are preheated separately to 110-125° F. above the melting point of phenol, and entering at opposite ends of the 7-stage extractor come into counter-current contact, a solvent-oil ratio of 125 to 165% of phenol being used. Treated oil, containing 8 to 15% phenol, from the final settling tank, is pumped to a pipe-still, from which the heated oil passes to a bubble tower, where the phenol is distilled. Residual oil finally passes through a vacuum stripper, where the separation is completed; quantity of phenol remaining in the treated oil being of the extremely low order of 0.005%. Extract oil has a phenol content of less than 0.07%. Flexibility inherent in the phenol process enables a wide range of lubricating fractions to be handled, from low viscosity transformer and turbine oils to heavy cylinder stocks. These raffinates usually require a clay contact only as finishing treatment. Solvent losses for a period of 3 years on one plant amounted to about 0.15%, and have been reduced to 0.1%; corrosion occurring in the phenol recovery unit has been found to be due to the sulfides and organic acids concentrated in the extract, and this difficulty has been eliminated.

Nitrobenzene as a Selective Solvent

Research by Ferris and others of Atlantic Refining, on a large number of solvents, showed that nitrobenzene possesses to a high degree the properties necessary for selective extraction of lubricating oil stocks, and is applicable both to residual and distillate stocks, ranging in character from extremely naphthenic to Pennsylvanian. Extraction is carried out in a conventional 5-stage counter-current extractor consisting of 5 rectangular

settlers, each of which provides one hour of settling. Final raffinate and extract phases from the extractor are passed through cascade-type vacuum evaporators, working down to a final pressure of 10 mm. and a maximum temperature of 325° F. Final traces of the solvent—1 to 2%—are removed by stripping with live steam at 350° F. under vacuum. A temperature limit of about 350° F. is desirable to avoid oxidation of the oil by nitrobenzene, which takes place at higher temperatures.

Chlorex ($\beta\beta^1$-dichloroethyl ether) is being used as a selective solvent for refining lubricating oil stocks by Standard of Indiana. In addition to its high degree of selectivity, the solvent power of Chlorex is sufficiently high to enable heavy residual stock to be handled, while the low viscosity and high specific gravity facilitate separation of the 2 extraction phases. Industrial units for extraction with Chlorex have been constructed with varying types of extraction and recovery systems. Solvent losses are stated to have been reduced to less than 0.04% of the Chlorex circulated. Chlorine content of the oil products does not exceed 0.0017% for the raffinate, and 0.010% for the extract, and this is eliminated upon clay treatment. Chlorex requirements for a plant processing 40,000 gals of oil per day are of the order of 10,000 gals.

Utilization of Furfural

Furfural, as a selective solvent, is being employed by the Texas Co., and a commercial unit has been in operation since '33. This compound has good selectivity, and is used at relatively high temperatures, enabling viscous distillate and residual stocks to be processed. High specific gravity of furfural facilitates phase separation, while evaporation losses are minimized by its low vapor pressure. It is further characterized by low toxicity. Although somewhat liable to oxidation, this can be avoided by operation in a closed system.

As in most solvent processes, the continuous counter-current system is used for extraction; in this case a single-packed contact tower is employed in place of multi-stage operation. The raffinate phase is separated from the solvent by flash distillation under vacuum, and the remaining solvent, amounting to 0.4%, is removed by steam stripping under vacuum. Solvent is recovered from the extract phase in 3 stages utilizing atmospheric distillation, vacuum distillation, and, finally, steam stripping under vacuum.

Crotonaldehyde and Acrolein

A solvent extraction process utilizing crotonaldehyde has been developed by Foster Wheeler. This compound is characterized by good solvent power, and its comparatively low boiling point facilitates solvent recovery. Low specific gravity results in a small gravity differential between the phases, and in practice separation is effected by centrifugal means. The related compound, acrolein, of lower boiling point, has also been utilized in this process.

Tendency of low-boiling paraffins to precipitate out asphaltic material from lubricating oil stocks is particularly pronounced in the case of liquid propane. Addition of liquid propane at ordinary temperatures, under pressure, to an asphaltic residual stock, causes separation into 2 phases when the propane exceeds a certain critical amount. The asphalt, with some oil, is precipitated as a heavy viscous liquid; increase in the propane-oil ratio is, up to a point, accompanied by more complete separation of the asphalt, with a corresponding increase in melting point.

At low temperatures propane can be used very successfully for the dewaxing of distillate and residual stocks. Necessary temperature (—40° F.) is obtained by evaporation of a proportion of the liquid propane with consequent internal refrigeration.

Propane alone cannot be used as a selective solvent for the separation of naphthenic from the paraffinic constituents of lubricating oils, but its use in conjunction with a selective solvent, with which it is immiscible, has advantageous features. Presence of a large proportion of propane diluent diminishes the amount of the paraffinic constituents of the oil in the extract phase, and at the same time decreases the solubility of asphaltic and color bodies in the raffinate phase; under these conditions the extract layer appears capable of dissolving the asphaltic material.

Propane as a secondary solvent has been adopted with marked success in the Duo-Sol process, in which cresylic acid is employed as the selective solvent. This process has a high degree of flexibility, and has been applied with success to the treatment of asphaltic residual stocks. Paper presented before British Institution of Petroleum Technologists, digested in British *Chemical Trade Journal.*

Foremen Training

Summary of Plans Used By Industry Generally and the Cyanamid System Employed at Warners Plant Explained In Detail

Growing attention being given to employer-employee relations has served to focus attention on foremen and other supervisory employees because of their key position between management and the rank and file of the organization. This explains why, according to a report recently issued by the Policyholders Service Bureau of Metropolitan Life, increasing emphasis is being placed on the training of such supervisors. A report, *Training Supervisors and Key-Men,* presents an outline of the practices of 85 companies.

A clearly defined purpose is essential to the success of training programs. Analysis of methods of the 85 companies shows that there are 3 predominating objectives: (1) providing foremen with an opportunity to acquire information, (2) helping them to think clearly about their jobs and (3) developing ability in doing what is required of them. Methods of training vary from the studied informality of the "conference" method to schedules of lectures on such subjects as economics, psychology, time study and cost accounting, also on company organization and history, products and markets, plant policies and practices. Report, referring to discussions used in connection with training lectures, states that it has been found that information acquired through such methods is better understood and more readily accepted.

Essentials for success in a program of foreman training are active interest from the management, a competent leader, a carefully selected group, practical subjects for discussion. Report states that there is difference of opinion as to the possibility of measuring results of training programs. Some companies, however, point to specific improvements in departmental production, to changes in attitude of certain foremen, or to the fact that trained foremen have developed faster as a group than those who have not received training.

Cyanamid's Highly Successful Methods

Report also discusses methods of planning a training program, and the costs of a training program. Details of the practices of 7 companies are outlined at some length. Of particular interest to chemical plant executives is the story of the formal training plan employed by American Cyanamid at its Warners, N. J., plant.

During the spring of '28 the 1st formal training plan at this plant was organized. Two courses in First Aid were conducted by 2 employees who were authorized Red Cross first-aid instructors. These courses consisted of 15 hours of instruction and an examination conducted by a physician. Twenty-four foremen completed the course and received the Standard 1st Aid Certificate issued by the Red Cross. Six completed an additional 15 hours of instruction under a Red Cross doctor and received advanced course certificates. Similar courses were given in '30 and '33. In '30 the management sponsored

a Foreman's Training Course conducted by the Extension Division of Rutgers. This consisted of 8 lessons of 2 hours each, and meetings were held once a week. Forty-seven men completed the course, cost of which was shared by the men and the company. Subjects discussed were: 1. Responsibilities; 2. Leadership; 3. Lighting and Cleanliness; 4. Employment and Safety; 5. Working Conditions; 6. Handling of Materials; 7. Standardization; 8. Costs.

The management sponsored a further Rutgers course in November, '32, on Industrial Economics. Superintendents, supervisors, and department heads participated, meeting once every 2 weeks until the 8 2-hour lessons were completed. Course covered 11 subjects as follows: 1. The Business Cycle; 2. Credit and Banking; 3. Profits and Wages; 4. Distribution; 5. Unemployment; 6. Problem of Security from Want; 7. Economic Aspects of Government Control; 8. Ownership; 9. Taxation; 10. Foreign Trade; 11. Economic Planning.

A 3rd University Extension Course was given during the fall of '33. This course was conducted for plant executives and department heads, rather than foremen. It consisted of 16 meetings of 2 hours each covering following subjects in industrial psychology by means of lectures, discussions, and reading assignments: 1. The Problems of Psychology in Industry; 2. Mechanisms of Behavior; 3. Emotions; 4. Intelligence; 5. Personality; 6. Morale; 7. Appraising Character, Experience, and Aptitude; 8. Rating Employees; 9. Training; 10. Safety in Industrial Occupations; 11. Industrial Psychology and Scientific Management; 12. Creative Leadership.

At the same time another series of foremen training conferences was organized. Company, profiting by previous experience, drew up its own outline, selecting subjects believed to be of the greatest interest and benefit to the foremen. Plan followed was a combination of the lecture, discussion, and conference methods, and during the course a number of executives presented papers on special subjects such as chemical engineering, mechanical engineering, cost accounting, production, personnel, and safety engineering problems. General purpose of the course was better to acquaint foremen with the company's organization and to give them a broader view of their own responsibilities. Subjects selected for the course were: 1. Organization and Management; 2. Functions and Relationship of Executives in the New York Office to This Plant; 3. Functions and Relationship of Department Heads; 4. Functions and Relationship of Foremen; 5. Job Analysis; 6. Job Training.

Other courses conducted in previous years included a series of foremen's safety conferences in '32, in which an outline published by the Policyholders Service Bureau of the Metropolitan Life Insurance Company was used. Following year foremen of the mechanical department were given a special course on Waste. This was based on a pamphlet published by the American Rolling Mill Co.

All of the courses described were held at the plant on the company's time. In addition, a number of employees were encouraged to take special courses at night in accounting, engineering, chemistry, safety, fire prevention, personnel, administration, and similar subjects. These were given at various colleges, technical schools, high schools, and Y. M. C. A.s throughout the Metropolitan area. In the majority of cases the company paid a part of the tuition fee.

The Engineering Construction Organization's Place

By J. R. Lotz

Function of the engineering construction organization in the chemical field is defined by J. R. Lotz, vice-president of Stone & Webster Engineering in a recent issue of *The Manufacturers' Record*. Mr. Lotz writes from 1st hand experience gained in actual chemical construction of such plants as Mathieson's at Lake Charles, the TVA fertilizer works, Southern Mineral Products at Piney River, Va., and Atmospheric Nitrogen at Hopewell. He develops a number of vital angles to the question of whether or not to employ outside engineering organizations in projected plant construction.

Of all branches of industry, progress in chemistry was perhaps the slowest, though a sound nucleus in this field existed a century ago. Needs created by the World War gave the American chemical engineer his opportunity, and, with that impetus during the past 20 years, in spite of the world-wide depression from which we are emerging, this branch of industry has experienced a phenomenal growth.

The Individual Engineer Is Handicapped

This rapid development, the complexity of the problems involved and the need for highly specialized effort have made it practically impossible for an individual engineer to keep abreast of the progress being made in the industry as a whole and adequately meet the requirements of research, design, construction and operation which vast modern projects demand.

Resulting need for cooperative effort to accomplish complicated tasks imposed has brought about the formation of engineering-construction organizations which have so important a part in our present day industrial development and which are equipped to undertake complete design and construction or to function equally well in collaboration with a strictly technical group, interested primarily in the development of highly specialized processes, or the engineering or design phases of a project.

Probably in no field is research and process engineering on so theoretical and scientific a basis as in that of chemistry or the contribution of the construction engineers so important. Ability to interpret intelligently requirements of special plans or processes; to schedule construction progress to meet established dates; to purchase, inspect and expedite materials and equipment; to coordinate construction effort for the accomplishment of desired ends and to control expenditures with respect to fixed budgets are necessary and highly valuable supplements to the strictly technical effort and are the construction engineer's principal and most important functions.

Broad Background of Experience

In addition, the broad background of experience of the engineering-construction organization in many branches of industrial activity brings to the aid of the chemical and research engineer practical as well as technical knowledge of the workability of processes and equipment and their adaptation to structural and construction requirements. This knowledge, based on experience, which is readily available only in such organized groups, is valuable not only in itself but in the freedom it provides to the chemical engineer for concentration of time and effort on the difficult problems involved in the development of intricate processes.

Necessity For Close Cooperation

Construction-engineering implies organized effort of the highest order. It infers a coordination of engineering and construction forces working as a unit in the carrying out of projects in all their numerous and complicated phases from the flow diagram based on laboratory analyses or pilot plant operation to the manufacture of finished products on a commercial basis.

To succeed and endure such an organization must embody a rare combination of business judgment, technical knowledge and construction experiences; ability to weigh values, to harmonize theory with facts and good practice and to balance the refinements of engineering research and design with the practical needs of equipment and construction. In short, it must produce a sane and orderly program of procedure toward a preconceived end which will result in maximum economy and speed.

It must, however, in addition, realize that satisfactory relations with a client must be based on mutual confidence and that every safeguard must be taken through the maintenance of strictly confidential relations to protect the proprietary rights of the client in a given process or method; and thereby avoid as far as possible a competitive invasion of his business.

Safe Chemical Operations

By P. J. Carlisle

P. J. Carlisle of the R. & H. Chemicals Dept. of du Pont and with headquarters at the Niagara Falls plant, outlined for the Chemical Engineers at the recent Columbus meeting the essential principles of safe operation in chemical manufacture and illustrated these principles by discussing several examples of actual hazards. Du Pont has in its organization what is known as the Safety and Fire Protection Division with representatives in each plant. Reported Mr. Carlisle: Safety in the chemical plant and laboratory should be regarded in the same light as such other important production factors as yield, production rate, and purity. Only by the conscientious assumption of responsibility by the supervising chemist can valuable property and the health of employees be protected against the harmful effects of noxious materials. Information concerning apparatus, wearing apparel, and other safety protective equipment can be secured through the usual catalogs and pamphlets, but the intelligent use of such equipment must nevertheless be enforced by the supervising chemist. Safety is not a subject to be emphasized periodically by sporadic campaigns or other intermittent promotional plans. It is a subject for everyday consideration in the plant and laboratory.

Chemical Engineer Carlisle tells about the safety duties of supervising chemists.

In order to assure the attainment of safe operation, the supervising chemist must have the following knowledge:

1. A thorough knowledge of the characteristics of the raw material being used.
2. A realization of the effect of such raw materials, alone or in combination, upon the health of the persons involved in the work, upon the property involved, and upon the continuity of operation.
3. A thorough knowledge of and acquaintance with the available equipment which can be used to protect life and property against the possible ill effects of raw material.
4. A knowledge of the preferred operating procedure to be followed in using such raw materials.

Knowledge concerning the chemical behavior of raw materials is particularly important. For example, it is generally recognized by all chemists that the element "Potassium" reacts with water to form caustic potash and to give off hydrogen. It is common knowledge that the hydrogen may be ignited in the presence of air and cause explosion and that the caustic potash so formed is corrosive. However, it is not common knowledge that a violent explosion may be produced by the simple cutting of a dry stick of potassium which is coated with oxide and peroxide. Within the last months this actually happened in a research laboratory when a chemist attempted to cut a stick of potassium immersed in oil. In this case definite knowledge of this reaction of potassium with the peroxide to form oxide was not had by the supervising chemist.

In another case it was desired to neutralize the free chlorine in a large steel vessel before venting it to the atmosphere of a closed building. The supervising chemist attempted this neutralization by bringing free ammonia into contact with the free chlorine inside the vessel. He did not know that free chlorine and free ammonia will form nitrogentrichloride which is a powerful explosive. By good luck, in this case, the explosion was avoided.

Also important is knowledge concerning the physical behavior of raw materials, especially when handled in large quantity. For example, a large quantity of solid potash was being dissolved in water in a large open kettle which was gently heated by a small flame. The proper quantity of water had been added to the pot and several tons of large lumps of potash were added. Batch was then allowed to heat slowly by means of the flame under the pot. Approximately 2 hours after the dissolving had started a workman proceeded to stir the liquid in the pot with a long steel rod. As soon as the rod was drawn up from the lower layer of the liquid a violent explosion occurred which completely emptied the pot of its charge and endangered the lives of several workmen who were employed in that area. In this case the explosion was caused by the stirring of the very weak caustic solution on top into the concentrated hot caustic solution in the bottom of the pot. This caused the instantaneous evolution of a large quantity of steam resulting from contact of the weak solution with the hot concentrated solution.

Industry is recognizing more and more the importance and value of a thorough acquaintance with chemicals and their effect upon the workers' health before their use in the plant or laboratory has been initiated. Thus, within the last year, the du Pont Co. established a laboratory of toxicology known as the Haskell Laboratory of Industrial Toxicology which is devoted to the experimental investigations of the toxic effects of the raw materials which they use and of the finished products. The intent is that customers and their employes shall be protected as well as employes of the du Pont Co. itself.

Plant Operation

Maintenance Department Accounting Practices

Cost of lost production time due to a breakdown and its repair should be added to the cost of the repair and the entire amount charged to the maintenance department—that is the belief of one of the executives quoted in *The Maintenance Department*, a report recently issued by the Policyholders Service Bureau, Metropolitan Life Insurance. Other equally suggestive comments, particularly concerning practices and procedures, are quoted in this new report, which is the result of a survey of the practices of several representative companies. Organization, operation and control methods are discussed in usable detail.

Preventive maintenance is listed as being one of the foremost of the various functions of maintenance departments. The report states that a popular procedure in carrying out a plan of preventive maintenance is the use of inspection report cards containing lists of items that must be checked.

Under the heading "The Control of Maintenance Work," report discusses budgets, order systems, schedules, authorization and wage incentive plans. The budgeting of maintenance work, states the report, is based upon these factors: past experience, estimated increase in maintenance cost due to age of equipment, estimated reduction in maintenance cost due to preventive maintenance, and the forecast of volume of production for the next budget period. As in other parts of the report, the actual practices of representative manufacturers are cited in some detail.

"The education of maintenance employees to secure their cooperation in reducing costs," the report states, "will often assist in creating economies." Wage incentive plans, if practicable in individual plants, are cited as another method of

producing economies. It is pointed out, also, that should the maintenance department be charged as a matter of policy with the increased cost of production due to a breakdown, the department would establish rigid inspection methods and reduce penalties to a minimum. In the concluding pages, the report summarizes the actual maintenance set-ups of 5 prominent companies.

Fire Prevention and Protection In the Industry

Bernard F. Flood, writing in *Industrial & Engineering Chemistry*, Nov., p1305, suggests 5 points for consideration on the matter of fire prevention and protection in the chemical industries when a new plant is to be designed or an old plant remodeled.

1. Construction should be as nearly fireproof as feasible.
2. The hazardous processes should be isolated within separate fire areas.
3. All specially hazardous processes should be properly safeguarded.
4. All hazardous conditions not inherent to the process should be eliminated or safeguarded.
5. Ample fire-fighting equipment should be provided.

He concludes: fire insurance rates are established, in general, by a central rating bureau; all fire insurance companies subscribe to the rates established by the bureau in their territory. Several systems of rating are in use in the various sections of this country but all are based on the same general principles—analyzing and charging for hazards and allowing credits for protective features. Rating organizations and the fire insurance companies stand ready and willing to cooperate in every way with those who are interested in reducing fire hazards to a minimum. Plans and specifications submitted to them receive the attention of specially trained engineers who may be able to point out in advance modifications which, while not affecting the operation of the plant, tend to lessen the hazards and thereby reduce the fire insurance cost.

Neutralizing Ammonia Leaks With HCl

Ammonia gas leaks are treacherous to work around. A method whereby such fumes may be neutralized has been worked out by Dr. Reuben W. Warner, chemist of the Newark, N. J., Dept. of Public Safety. It consists of the use of hydrochloric acid, properly diluted and sprayed into a room or other enclosed space through a specially constructed pressure nozzle. It does not mean that gas masks are unnecessary, but the resulting sal ammoniac is far less dangerous than the concentrated ammonia fumes.

Employment Contract Practices

Joseph Rossman in *Industrial & Engineering Chemistry*, Dec., p1510, reports a wide survey of companies on their policies on the subject of employment contracts for chemists, etc. Surprising are the number who do not require the signing of a specific contract.

Reaction of Metals to Various Acids

The British Chemical Engineering Group at one of its recent meetings discussed the handling and storing of acids and some of the limitations of modern constructional equipment and containers. The various common acids were taken up and their effects discussed. The British *Chemical Age*, Dec. 7, p316.

Plant Equipment

Modern Salt Plant Installation Described

Latest in design and construction of a continuous plant for salt production from brine (plant of the Goderich Salt, Goderich, Ont., Canada) is described by Clinton S. Robinson in *Canadian Chemistry & Metallurgy*, Dec., p 324.

The triple effect vacuum pan plant was built of selected materials, having under consideration low maintenance as well as 1st cost of construction. Steel plates, ⅝ to ¾ inch in thickness, fabricated by electric welding, were used for the vacuum pan bodies. Welded steel construction has proven superior to sectional cast iron design formerly used for salt pans. Welded evaporators are absolutely free from any air leakage, are more economical to construct and erect, and require less framing support, on account of lighter weight.

Evaporators Shipped Assembled

Evaporators were completely assembled in the shops and shipped ready for erection. One of the units at the Goderich plant is 50 ft. high and 12 ft. in diameter at its major section. Approximate weight is 12½ tons, maximum for rail transport. One of these vacuum pan bodies was set on the supporting frame in 4 hours.

In welding of the steel sections, 9 to 11 rows of welding rod are used in the fillets, so there is no possibility of leakage. Steel pans can be covered immediately after installation with suitable insulating material, such as magnesia board, mineral blanket or insulating cement, which is applied from 1½ to 2 inches in thickness, depending on the rate of heat transfer. Erection of a cast iron pan of similar size would take many days and insulation could not be safely applied for at least 2 months, as leaks may develop in built-up sectional cast iron equipment.

Novel Filter Presses Designed

New plant is equipped with a filter which separates the excess brine from the salt slurry, as the slurry is delivered to the filter from the evaporating pans. Type installed at Goderich has a drum 6 ft. by 2 ft. and a daily capacity of 200 tons of dry salt. Machine acts as a continuous filter and dryer. Slurry of brine and salt, of a pre-determined density, is received through an ingenious top-feed mechanism. Filter drum is fully encased in a housing which has ducts, connected to a series of heating units. A constant pressure is maintained on the filter housing by means of a blower, in order to prevent the influx of cold air.

Machine is constructed of cast "Ni-resist," with housing and screen of "Monel" metal. Non-corrosive metals are employed throughout to overcome the well-known corrosive and erosive effect of salt.

Salt slurry is delivered to the screen on the face of the drum of the filter. Excess brine is exhausted by means of a centrifugal exhauster, which serves to maintain a constant flow of air through the screens. Exhauster can be operated over a wide range of capacity for high drying economy, and the rotating speed of the drum filter can be adjusted to meet variations in amount of production.

Salt is completely dried during a single rotation of the drum of the filter, about 98% of the moisture being extracted through the screens and the remainder by direct drying by hot air drawn through the filter cake of salt on the screens. Pure dried salt is finally scraped from the screens of the filter by a stainless steel knife and falls into the boot of the filter housing. From here, the finished salt is conveyed to the screen room in the packing building or to the dry storage warehouse.

Bin Shapes and Feeders

Bin shapes and feeders are discussed by Harlowe Hardinge of the Hardinge Co. in November *Industrial & Engineering Chemistry*, p1338. Article brings out several points not generally known, both as to proper bin shapes for various materials and as to the proper method of delivering the feed under conditions which will be most beneficial to the particular apparatus or process.

Much can be accomplished in the way of reducing processing costs and improving the product by a closer study of bin shapes, the flow of material from the bin, and the proper means to insure a constant rate of feed by weight rather than by volume. Simple and inexpensive means are available for the majority of cases, and these simple changes might easily pay for themselves in a matter of weeks.

Industrial Chemicals

Conversion of Hydrogen Sulfide to Sulfuric

A process of the Metallgesellschaft A.G., for converting sulfuretted hydrogen or sulfur into sulfuric acid, is discussed by Dr. W. Siecke, in the *Chemische Fabrik* of Oct. '30. New process comprises 3 stages: (1) Oxidation of hydrogen sulfide with sulfur dioxide and water; (2) passage of the burned gases over a constant layer when further oxidation to sulfur trioxide is effected; (3) conversion of gaseous sulfur trioxide into sulfuric acid in a condensing apparatus. In practice, according to Dr. Siecke, the initial oxidation is effected at a temperature of 750° to 800° C., and the resulting gaseous mixture (containing about 4 to 7 volume % sulfur dioxide and 5 to 8 volume % oxygen) is allowed to enter the contact chamber at a temperature of about 400° C. The contact vessel is equipped with a jacket which can be used for heating when starting up the reaction and for subsequent cooling. Process can be applied to by-products of lithopone and blanc fixe manufacture as well as to many other manufacturing processes in which sulfuretted hydrogen is formed, examples being anthracite distillation, lignite coking processes and the hydrogenation of all sulfur-containing tars and tar oils.

Improved Process For Perborate Manufacture

It has been found by the N. V. Industrieele Mj. voorheen Noury and van der Lande of Deventer, Holland, according to British *Chemical Trade Journal*, Oct. 18, p328, that the properties of alkali perborates produced by acting upon boric acid or borates in aqueous medium with hydrogen peroxide or similar compounds may be improved very considerably by allowing the reaction to take place in the presence of a small quantity of one or more soluble salts of the metals of the alkaline earths, magnesium, and zinc.

Suggested New Method For Barium Chloride

R. Norris Shreve and William Nelson Pritchard of Purdue report in the December issue, *Industrial & Engineering Chemistry*, p1488, that calcium chloride decomposes barium sulfate to give barium chloride and calcium sulfate when organic or non-ionizing solvents are used; that ethylene glycol with the addition of methanol is particularly recommended for removing the barium and calcium chlorides from the reaction product. Authors suggest process as a possible commercial method of barium chloride manufacture.

Coal-Tar Chemicals

High Pressures Not Necessary

Annual report of the British Fuel Research Board has been made public. Of special significance in the U. S. is the announcement that it has been found that the technique of hydrogenation does not necessarily require high pressures, and that through better knowledge of catalysts, a process has been worked out on a semi-commercial scale at the Fuel Research Station for treating, at atmospheric pressure, acids present in coal-tar from gas works and coke-ovens to obtain gasoline.

Considerable interest attaches to a modified method of operating horizontal retorts, which has been developed at the Fuel Research Station. It has long been the practice to introduce steam into vertical retorts during carbonization, but certain practical difficulties prevented this being done in horizontal retorts. Report states that a successful method has now been evolved at the Station, and the results show that the output of gas can be increased 8 to 10 therms per ton of coal carbonized at very slight extra cost. Several large gas companies have been quick to realize this, and have adopted modification in their works.

Treatment of Benzol For Impurities

In the manufacture of benzol through the destructive distillation of coal, impurities occur which are usually washed out by expensive chemical means. Some of these impurities do no harm and may prove beneficial if left in the benzol providing the benzol is to be used in a motor fuel blend. Development and Patent Dept. of the Standard Oil (Indiana) recognized this problem and developed a commercial process which employs an antioxidant for the more economic treatment of benzol intended for motor fuel use. A full description of the new antioxidant treating process is outlined in an article by Vanderveer Voorhees in *The Oil & Gas Journal*, Dec. 12, p36.

Purification of Naphthalene

A recently granted English patent (435,717) discloses some of the details of a French modification for the purification of crude naphthalene, particularly when the refined naphthalene is later to be hydrogenated. *British Chemical Trade Journal* summarizes these as follows: Under the present invention, crude naphthalene, vaporized for example by being drained, dripped or pressed, liquefied at a temperature of 80 to 100° C., then directed and distributed into an evaporating apparatus maintained at a temperature of about 230° C., is, without undergoing any cooling action, conveyed through 2 purifying chambers in series, of which the 1st contains iron, copper, nickel or cobalt or chromium, disposed so as to afford an extensive contact surface, and the 2nd a mixture of porous carbon and calcium, iron, copper, nickel, cobalt, chromium or their oxides, temperature of the purifiers being maintained between 250° C. and 400° C.

Metals utilized in the 1st chamber are disposed in such manner as to afford the most extensive surface of contact as by employing them in the form of gauze rolled to small cylinders, or in the form of coiled wires. Mixtures of metals and carbon utilized in the 2nd chamber are advantageously obtained by calcining in a closed vessel the organo-metallic compounds resulting from the action of acetylene upon these metals in a state of a very fine division.

Purifying apparatus may be built with duplicate series of purifying chambers, so that the 1st series can act as a purifier, while the 2nd series, which has become loaded with impurities in the course of previous use, is regenerated by means of the action of a current of air or draught passing through the 1st purifying chamber and of a current of steam mixed with hydrogenating gas passing through the 2nd chamber.

It is stated that naphthalene hydrides, when prepared from naphthalene according to the invention, constitute an excellent stabilizer for industrial alcohol in gasoline. It is mentioned that 5% by volume of naphthalene decahydride will stabilize the solution of 10% of alcohol in gasoline.

Fine Chemicals

Manufacture of Monomethyl Para-Amino Phenol

H. von Bramer and A. C. Ruggles, Tennessee-Eastman, report that if hydroquinone is first dissolved in a considerable quantity of water and aqueous methylamine is then added gradually to such solution under pressure at an elevated temperature, the production of tarry matter is avoided in the manufacture of monomethyl para-amino phenol, and the side reaction by which symmetrical dimethyl paraphenylenediamine is produced is substantially inhibited. In consequence, very nearly theoretical yields are obtained, and these are said to be very much in excess of any yields obtained by the Merck or Harger processes.

Utilization of Terpenes from Lemon Oil

Investigations on the chemical utilization of the terpenes of lemon oils are now being carried out by G. Romeo and G. Savoia, of Messina. Work as yet has not advanced very far, but promising results have been obtained by treatment of the terpenes with sulfuric in alcoholic solution. Conversion products which are rich in alcohols contain also ketones and other oxygenated bodies.

Properties of Pure Calcium

Examination of the properties of highly purified (99.3%) calcium has revealed relative stability of the pure metal in contact with hydrochloric diluted with alcohol. Caustic soda (26° Bé) has also been found to attack the pure metal very slowly although the action becomes more marked with increasing dilution (P. Bastien, *Rev. Métallurgie*, 1935, p120).

8-Hydroxy Quinoline Production

According to a Russian patent (38,152) 8-hydroxy quinoline is prepared by heating 8-chloroquinoline at 200° to 300° C. in aqueous alkaline solution in an autoclave in the presence of metallic copper or a copper compound. Separation of the reduction product from the reaction mixture is effected by usual methods.

Converting Guaiacol to Vanillin

Guaiacol may be converted into vanillin by the reaction with formaldehyde in the presence of ferrous sulfate and sulphophenylhydroxylamine. Latter is obtained by electrolytic reduction of nitrobenzene sulfonic acid. Formaldehyde is added gradually to the guaiacol in aqueous alcohol after the other ingredients have been incorporated. This is a Russian patented process, 37,702.

Agricultural Chemicals

Saturation Method of Sulfate Manufacture

In a recent issue of *Fertiliser, Feeding-Stuffs and Farm Supplies Journal*, British, there is reported the development of a so-called saturation method for ammonium sulfate production. Process, patented in many countries, and to be used under licence by the N.V. Maatschappij tot Exploitatie van Koksovengasen, consists in the addition of phosphoric acid or phosphates to the saturation bath, while the acidity is kept below 1.5%, or preferably between 0.5 and 1%. Effect of these reagents is to precipitate the ferric, aluminium, and chromium salts present, with the result that more favorable conditions are provided for the growth of the crystals. The coarsely crystalline ammonium sulfate manufactured by this method is specially recommended to the agriculturist, as it does not cake during storage, can be easily distributed over the fields either by hand or by machine, and is not blown away during application.

New process of the State Mines is also more economical to the manufacturers than the old method. There is less depreciation of equipment, as the lower acidity of the bath considerably reduces corrosion. Further, a 2nd neutralization of the product is rendered unnecessary, as the product from the 1st operation contains only about 0.02% of free acid.

Laboratory

Laboratory Aprons of Oiled Silk

Laboratory aprons are now being made out of oiled silk or oiled pongee. They are much lighter in weight than the rubber coated ones now generally in use. Oiled silk was a development out of the G. E. Laboratories, and the Blossom Manufacturing Co., 79 Madison ave., N. Y. City, is distributing the aprons.

Colorimetric Determination of Benzene

A report on a microcolorimetric method for the determination of benzene has been prepared by the staff of the gas section at the Pittsburg Experimental Station of the Bureau of Mines ("U. S. Bureau of Mines Report of Investigations, 3287").

New Safety Kit With Novel Features

A new first-aid kit, designed to meet the specifications of leading industrial medical directors, has been adopted as standard by Standard Oil of N. J. and other large American industrial companies. Special feature of this new kit, which is known as the "Brac-Kit" and was developed by the Davis Emergency Equipment Co., N. Y. City, is that it can be permanently installed in a given place, but its contents are instantly available in emergencies and are protected from contamination and damage when treatment is being applied.

Estimation of Phthalic Acid In Resins

New method of estimating phthalic acid in alkyd resins and phthalic acid esters is reported in a recent issue of *Farben Zeitung*. The phthalic acid is estimated gravimetrically, in the form of its calcium salt crystallized with one molecule of ethyl alcohol. Author has investigated in detail the resorcin method for the detection and estimation of phthalic acid and anhydride, but concludes it is unreliable as in numerous cases resorcin alone will give rise to pronounced fluorescence.

Quick Method of Evaluation Chrome Ore

A modified method for the evaluation of chrome iron ore is given by Prof. F. J. Tromp in the *Journal of the Chemical, Metallurgical and Mining Society of South Africa*, for July, '35.

Photographing Microscopic Studies

Photographing microscope studies are now very easy with a new, specially designed camera.

Bulk Packaging

New Drum Washers Offered

Three new drum washers are on the market (Eureka Machine, Cleveland) for handling 55 gal. drums. In each case the arm is charged with 5 to 7 gals. of hot water and cleaning medium, plug inserted, drum placed in the machine, cross clamp screwed tight and the clutch engaged. In the 1st type motion is "head over head." If cleansing proves difficult chains are introduced through the bung. Second and 3rd types have vertical as well as lateral motion (7½ R.P.M. vertical to 1 horizontal). Third handles 2 drums at once. First type weighs 500 lbs. and occupies 3 x 7 ft. floor-space; 2nd, 950 lbs.—3 x 7 ft. space; 3rd, 1600 lbs.—5 x 9 ft. space. Power required to operate is ⅓ H. P. for the 1st and ½ H. P. for the other two.

Rubber Lined Fiber Containers

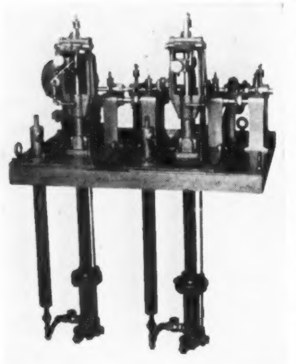
Those with bulk container problems to solve were particularly interested at the recent Chemical Exposition in the rubber lined fiber drum displayed for the 1st time by Carpenter Container of Brooklyn.

It is claimed that these rubber lined drums have successfully withstood tests made with 10% caustic soda solutions, 95% denatured alcohol, 10% sulfuric, and also boiling water. They may be steamed out without injury to the rubber lining or affecting its adhesion to the outside fiber shell. Samples for testing purposes are now available in drums of 5, 10 and 30-gal. capacities.

New Equipment

Pumping Sulfur Efficiently — QC 317

A new molton sulfur pump has just been perfected. Outstanding feature of this pump is that the actual pumping unit, check valves (with steam heated discharge pipe) are submerged in the sulfur. The dual unit provides for a spare in case of emergency. Each unit can be removed from the pit without affecting the operation of the other unit. In case of difficulty, one unit can be cut out and the other cut in with the clutch arrangement in the rear. Adjustment of delivery can be made while the pumps are in operation. It is not necessary to shut the equipment down to change the volume delivered. Provision is made for an automatic cut-out in case the pumping equipment is started before the sulfur (in the check valves and pump) is reduced to a liquid state. Likewise, a special priming device is provided for flooding the pump at starting of operations.



Eliminating Valve Sticking — QC 318

A new accessory for air-operated control valves, the Vernier Valvactor, developed to eliminate valve sticking and to assure hair-line valve positioning is one of the latest additions in control instrument field. This device enables throttling type air-operated control instruments to make small gradual adjustments of the control valve position regardless of friction or hysteresis. It is claimed that the air from the control instrument need change as little as ½ inch of water to cause a corrective positioning of the valve and force the stem to take a position within 1/1000th inch of the previous one.

Valve With Position Indicator — QC 319

Some months ago this department mentioned a new valve with the handwheels available in various colors. An English firm has now placed on the market a position indicator on the handwheel.

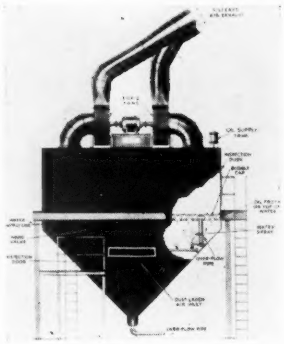
In any process where it is desirable to know the exact amount of oil, water, gas, or other fluid that is passing through the valves this device should be of great assistance. Once the best setting for any particular process has been determined it is possible to secure the same setting and the same result every time.

Leak Detector for Refrigerant Gases — QC 320

A very useful halide leak detector for refrigerant gases has just been placed on the market. It is an invaluable aid for locating leaks in refrigerating or air conditioning units. The non-combustible halide gases are relatively odorless, tasteless, and colorless which makes their detection rather difficult. The detector cannot, of course, be used with ordinary refrigerant gases, such as carbon dioxide and sulfur dioxide, because these gases do not cause a flame color change, the basis of its action. Nor should it be used on certain halide derivative gases which are combustible, such as ethyl chloride and methyl chloride.

Economic Dust Collection — QC 321

Dust collectors with no moving parts except the fan are now being marketed. They are entirely automatic and particularly well-rated on the matter of economy of operation. Dust-laden air is drawn through ducts to the equalizing chamber. It is then passed upward through "bubble caps" into a water bath which is covered with an oil carpet and discharged from the upper chamber with a fan. The larger dust particles are removed in the water. Fines are trapped in the oil carpet. Repeated tests, on dust 25% of which passes through a 200 mesh screen (75% ranging from 2 to 10 microns in size), have shown an efficiency of not less than 99.80% by weight. Dust passages as low as .015 grains per cu. ft. are not unusual. They are compact. They require a minimum of floor space—and may be suspended from the building members, or mounted on the roof.



New Centrifugal Pump — QC 322

A new centrifugal pump, designed specially for hot well service and for handling liquids near their vapor pressures, has just been announced. Power plants, oil refineries, breweries, heating systems, air conditioning plants, chemical, refrigerating, and many other industrial plants use this type of pump for handling volatile liquids against medium heads.

Explosion Proof Motor — QC 323

A recently completed 300 h.p. 3600 rpm., explosion proof industrial motor is totally enclosed and self-cooled by passing air over the exterior. All exposed parts with the exception of shaft and blower are of cast iron, a material preferred in oil refineries and many chemical plants because of corrosive fumes present.

Valve With Micrometer Setting Indicator — QC 324

A new type of valve that combines a micrometer setting indicator with proportional or "straight-line" flow control is available.

Subsurface-Pressure Gage

Recognizing need for accurate measurements of pressures and temperatures within the reservoir and well "flow strings" in order to apply scientific methods to the solution or analysis of many problems encountered in the production of oil and gas, the Bureau of Mines has issued a report describing design, construction, and operation of a new subsurface-pressure gage. This instrument has been developed by W. B. Berwald, H. A. Buss, and C. E. Reistle, Jr., at the Petroleum Experiment Station of the Bureau, Bartlesville, Okla., and has been used successfully by Bureau engineers for the past year. Report of Investigations 3291, Bureau of Mines Multiple-Diaphragm Recording Subsurface-Pressure Gage, may be obtained without cost upon application to the Information Division, U. S. Bureau of Mines, Washington.

Chemical Industries,
25 Spruce St., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 317	QC 321
" 318	" 322
" 319	" 323
" 320	" 324

Name ....

Title .... Company ....

Address ....

Miscellaneous Booklets

American Society for Testing Materials, 260 S. Broad st. Philadelphia. "A. S. T. M. Standards on Protective Coatings for Structural Materials" includes paints, varnishes, lacquers, and paint materials. Specifications, methods of testing, and definitions are given. Reprint from society publications, 387 pp., selling for $1.75.

Dept. of Commerce, Bureau of Foreign and Domestic Commerce. "Check Sheet—Introduction of New Consumer Products." No. 7 of Market Research Series. 5c.

Dept. of Commerce, Bureau of Standards, Washington. "Paper-making Quality of Cornstalks," by Charles G. Weber, Merle B. Shaw, and Martin J. O'Leary. M. 147. 5c.

U. S. Dept. of the Interior, Bureau of Mines, Washington. "The Ignition Temperatures of Diethyl Ether and Ethylene in Air and Oxygen." By G. W. Jones, W. P. Yant, W. E. Miller, and R. E. Kennedy. R. I. 3284.

Dept. of the Interior, Bureau of Mines. " 'Base' of a Crude Oil," by E. C. Lane and E. L. Garton. R. I. 3279.

U. S. Tariff Commission, Superintendent of Documents, Washington. "Crude Phosphates and Superphosphate," report No. 100, 2nd series. 5c.

U. S. Testing Co., Inc., Hoboken, N. J. New price list, effective Sept. 1st, covers wide variety of chemical and physical tests.

University of Florida, Agricultural Experiment Station, Gainesville, Fla. "The Tung Oil Tree," by Wilmon Newell, Harold Mowry and R. M. Barnette, and revised by A. F. Camp and R. D. Dickey. Of present interest to paint varnish and lacquer producers

International Tin Research & Development Council, 149 Broadway, N. Y. City. "The Functions of a Technical Information Bureau," by E. S. Hedges and C. E. Homer. Miscellaneous Publication, No. 3.

International Tin Research & Development Council. "Solder," Bulletin No. 2, complete review of uses for tin solder, including soldering methods.

Iowa State College, Engineering Extension Service, Ames, Iowa. "Processing the Soybean," by O. R. Sweeney and L. K. Arnold. Of great interest just at present. Bulletin 103 (revised).

Booklets & Catalogs

Chemicals

A521. American Cyanamid & Chemical. "Specialities for the Tanning Industry," specific instructions for application and use of Company products by tanners.

A522. Commercial Solvents. November *Alcohol Talks* tells methyl alcohol's interesting story of manufacture and uses.

A523. Commercial Solvents. December, *Alcohol Talks* continues the November story on methyl alcohol.

A524. E. I. du Pont de Nemours, R. & H. Chemicals Division. New technical bulletin lists characteristics, properties, specifications, etc., of 16 important chlorinated hydrocarbons, nearly all of which are non-flammable and non-explosive.

A525. Electro Bleaching Gas. November *Pioneer*, more news of interest to chlorine users.

A526. Fisher Scientific Co. *The Laboratory*, Vol. VII, No. 3. Story of Louis Pasteur. Recent developments in analytical equipment are also described.

A527. Freeport Sulphur. December *Brimstone Brevities* includes exceptionally complete bibliography of recent literature on various type insecticide sprays. Short items are based on recent sulfur developments in sprays of many kinds. Excellent for agricultural sulfur users.

A528. Givaudan-Delawanna. November *Givaudanian* continues discussion of N. Y. City's pending Sanitary Code amendments affecting all major cosmetic producers.

A529. Givaudan-Delawanna, Industrial Aromatics Division. November *Givaudanian*, more news on paint deodorants.

A530. Glyco Products. New 36-page booklet describes many new specialty chemicals now in commercial production. Rarely found table listing pH values of acids catches the eye.

A531. Heyden Chemical. New list of products.

A532. Imperial Oil & Gas Products, Pittsburgh. "Carbon Black—Servant of Industry," covering production and industrial uses. Catalog 135.

A533. Innis-Speiden. *Isco News*, December, contains new listing of this company's products.

A534. Monsanto. *Monsanto Current Events*, December, discusses conversion of corn into food and industrial products.

A535. F. E. Schundler & Co., Long Island City, N. Y. "Bentonite Information Circular," directions for using bentonite in the laundry.

A536. B. M. Sergeant Pulp & Chemical Co. Complete list of products, issued to coincide with the '36 contract season.

A537. Seydel Chemical Co., Jersey City. *The Detailer*, 1st issue of this house organ, of interest primarily to pharmaceutical chemical buyers.

A538. Sherwood Petroleum Co., Brooklyn, N. Y. "Irradiated Petrolatums and Mineral Oils."

A538a. Philadelphia Quartz. December *Silicate P's & Q's* contains abridged list of Philadelphia Quartz technical publications, of use and interest to silicate users.

Monthly Price Lists

A539. Barada & Page, December list.
A540. Fritzsche Bros., Inc., Dec. 16 list.
A541. Magnus, Mabee & Reynard, November-December list.
A542. Mallinckrodt, December list.
A543. Merck, December list.

Equipment

A544. Allis-Chalmers Mfg. Co., Milwaukee. Large low head type S centrifugal pumps. Leaflet 2206.

A545. Allis-Chalmers Mfg. Co. Large high head type S centrifugal pumps. Leaflet 2207.

A546. Allis-Chalmers Mfg. Co. Leaflet 2208, small type HS, LS, and S centrifugal pumps.

A547. Allis-Chalmers Mfg. Co. Type M multi-stage centrifugal pumps. Leaflet 2210.

A548. Aluminum Co. of America. November *Aluminum News Letter* continues to present novel aluminum uses in many varied industries.

A549. The C. O. Bartlett & Snow Co. "Froth Flotation" Dust Collectors.

A550. Bartlett & Snow. "Froth-Flotation" air filters, new equipment built from successfully tested basic design.

A551. Climax Molybdenum. November, *The Moly Matrix*, more chrome-molybdenum alloy steel news.

A552. Consolidated Products Co., N. Y. City. Second-hand machinery for nearly every purpose described in December *Consolidated News*.

A553. Euclid Road Machinery Co., Cleveland. Standardized Diesel-electric locomotives, switching engines for yard use in large plants. Specifications given for 3 sizes.

A554. Fansteel Metallurgical Corp., North Chicago. "Tantalum," 48-page booklet, latest available information about this versatile rare metal.

A555. General Electric. Steam turbines for mechanical drive of pumps, fans, compressors, blowers, pulverizers, and paper machines. GEA-1145C.

A556. The Edwin F. Guth Co., St. Louis. Recently developed air-conditioning equipment for use in office or plant. Catalog No. 6.

A557. The Edwin F. Guth Co. Indirect lighting, competently handled by this complete line of fixtures, described fully in Catalog No. 28.

A558. Jeffrey Mfg. Co., Columbus, Ohio. Materials handling equipment parts, Catalog 417, 400pp. Specifications and list prices included.

A559. Jeffrey Mfg. Co. Jeffrey-Traylor type materials handling and electric vibrating equipment. Catalog 610, 64pp. Specifications for machine parts included.

A560. Leeds & Northrup, Philadelphia. "Electrical Measuring Instruments for Research, Teaching, and Testing."

A561. Link-Belt Co. New 32-page catalog on herringbone-gear speed reducers. All reducers rated on recently recommended practice of the American Gear Manufacturers Association.

A562. Littleford Bros., Cincinnati. Attractive folder advocates use of special corrosion and contamination resistant metal alloys for fabrication of equipment.

A563. Lukens Steel Co. Enthralling 23-page booklet on Nickel clad steel. Important uses and properties included with fine table of detailed applications to many typical chemical operations.

A564. Pangborn Corp., Hagerstown, Md. Applications of mechanical abrasive handling systems to modern blast cleaning room announced in this striking folder.

A565. Patterson Foundry & Machine Co. Agitating and mixing equipment presented in this 52-page booklet. Full specifications included.

A566. Petrometer Corp., Long Island City, N. Y. Distant reading tank gauges. Complete specifications and descriptions of gauge in use are included.

A567. Proportioners, Inc., Providence, R. I. Proportional processing of fluids. Booklet includes several types of proportioning equipment, thoroughly illustrated and classified.

A568. Republic Steel Corp. "Properties of Toncan Iron," new copper-molybdenum-iron alloy of many uses.

A569. John Robertson Co., Brooklyn. December *Robertson Reminders*, of particular interest to cable manufacturers, includes lead encasing presses, pipe extrusion presses, etc.

A570. Separations Engineering Corp., N. Y. City. "Franz Ferro-Filters," Magnetic separators solving iron contamination problems.

A571. Surface Combustion Corp. "Gas Carburizing by the Eutectrol Process." Operating data and illustration included.

A572. The U. S. Stoneware Co. "Flexlock" pipe joints, recent important development (rubber joints for stoneware), described in Bulletin 901. Uses and specifications are unusually complete.

A573. Worthington Pump & Machinery. Stationary feedwater heaters, standard non-deaerating type.

A574. Worthington Pump & Machinery. "Monobloc" centrifugal pumps, type DH, for hotwell service, and for pumping volatile liquids.

A575. Worthington Pump & Machinery. Horizontal duplex piston pumps, type VC, for general service use.

A576. Worthington Pump & Machinery. Multiple V-belt drives. Sizes and list prices given.

A577. Worthington Pump & Machinery. Centrifugal Pumps, single stage volute, Type LT. For pumping hot, volatile liquids.

A578. Worthington Pump & Machinery. Worthington Rock Hammers, horse shoe valve type, wet and dry patterns.

A579. Worthington Pump & Machinery. Horizontal Duplex Piston Pumps, for general service. Turret type, for handling liquids at pressures up to 200-lb./sq. in. Type TB.

Packaging

A580. Anchor Cap & Closure. Anchor Amerseals are likened to that daring young man who flew through the air in this striking circular demonstrating closure simplicity and efficiency.

A581. Anchor Cap & Closure. Attractive 4-page folder points out advantages of liner retaining ledge and recess molded caps.

A582. Chase Bag Co. December *Bagology*. Items of interest to bag users.

A583. General Plastics, North Tonawanda, N. Y. *Durez Packaging News*, November. Cases and bottle caps aid materially in merchandizing your product. This little pamphlet tells you how.

A584. General Plastics, Inc. December *Durez Packaging News*, more adaptations of plastics to small, attractive containers.

A585. Lewis-Shepard Co., Boston. Specialties for handling barrels, drums, carboys, cases, cartons, etc. Circular No. 316.

A586. Lewis-Shepard Co. Floor trucks for handling bulk packages in the plant or warehouse. Circular No. 215.

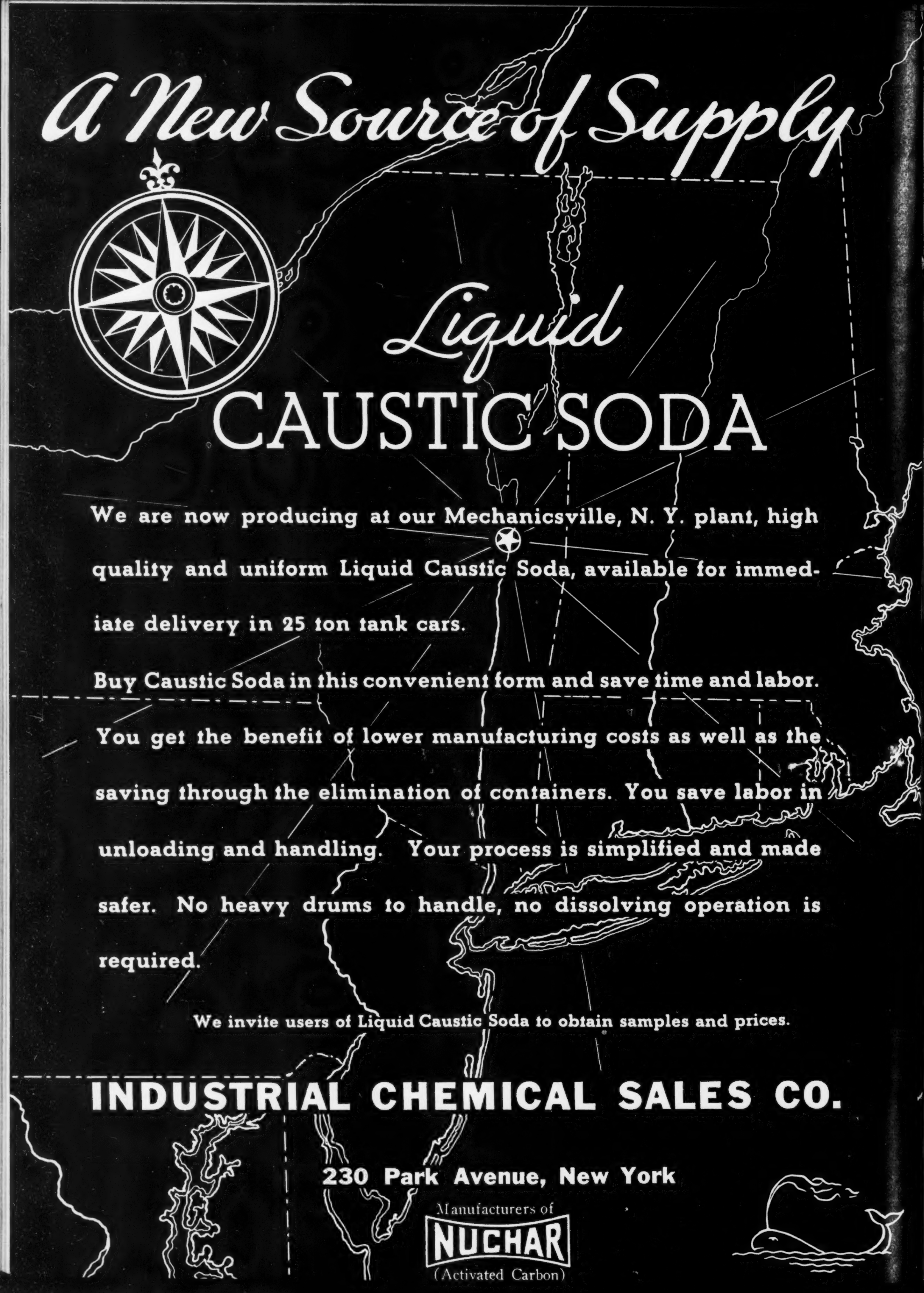
A587. Lewis-Shepard Co. Industrial uses for portable stackers or elevators. Circular No. 199.

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive the following booklets; specify by number: ....

Name ....
Title ....
Company ....
Address ....

All information requested above *must* be given to receive attention.


A New Source of Supply
Liquid
CAUSTIC SODA
We are now producing at our Mechanicsville, N. Y. plant, high quality and uniform Liquid Caustic Soda, available for immediate delivery in 25 ton tank cars.
Buy Caustic Soda in this convenient form and save time and labor. You get the benefit of lower manufacturing costs as well as the saving through the elimination of containers. You save labor in unloading and handling. Your process is simplified and made safer. No heavy drums to handle, no dissolving operation is required.
We invite users of Liquid Caustic Soda to obtain samples and prices.
INDUSTRIAL CHEMICAL SALES CO.
230 Park Avenue, New York
Manufacturers of
NUCHAR
(Activated Carbon)

Sorbitol and Mannitol

discussed by J. R. Frorer as

Glycerin Substitutes

TWO new chemicals made their bow at the Chemical Exposition. Chemically akin to glycerin and the glycols, one, Sorbitol, until now has been a laboratory curiosity, quoted at $400 a pound, the other, Mannitol, available only as an importation. Now, both are synthesized from corn sugar, and are available in tonnage quantities.

They were introduced to chemical society at the booth right opposite ours, and we had, therefore, rather exceptional opportunities not only to become acquainted with them, but also to note the impression they made upon Exposition visitors. We also heard their story first-hand from their industrial sponsor, James R. Frorer of Industrial Chemicals Division of the Atlas Powder Company. He is a short man for so long a title; but he is stocky, square-jawed, and full of enthusiasm for his fascinating pair of chemical debutantes, whom incidentally he has watched and tended since their infancy in the Atlas laboratories.

Here is their story as he told it to us one afternoon before the crowds began to throng into our booths:

"Sorbitol and Mannitol are hexahydric alcohols, that is, with six hydroxyl (OH) groups. Glycerin is a trihydric alcohol with three hydroxyl radicals, while the glycols are di-hydric alcohols. In other words, these new products have twice as many hydroxyls as glycerin and three times as many as the glycols. As all the six hydroxyl radicals are replaceable, their great number and molecular arrangement open up all sorts of interesting and novel possibilities in synthesis.

"The physical properties of Sorbitol show a regular and logical gradation from the properties of glycerin and the glycols. For example, in comparison with glycerin this new polyhydric alcohol is more viscous, less volatile, and has a very much narrower humectant range."

Physical and Chemical Properties

"To what uses," we asked, "are these variations in physical properties most apt to lend themselves?"

"If you will check over the uses of glycerin in your own CHEMICAL GUIDE-BOOK, you will find the uses of Sorbitol and Mannitol. As a matter of fact, they are so new we have only had a chance to begin to test out all their possibilities; but we have done quite enough experimental work and have sufficient actual industrial experience to know the lines along which their industrial applications are most apt to develop.

"Take Mannitol—it is the synthetic mannite, the active ingredient of the manna of the Old Testament, and for long centuries a favorite confection-laxative of the peoples of the Mediterranean countries. The world supply of the natural material comes from Sicily, and you can buy it in any Italian pharmacy. Another interesting use is in the test for boron in water, for which purpose a considerable quantity is annually consumed by city water supply departments.

Early Research Work

"One of the very earliest of our so-called modern explosives was made by nitrating mannite. It has some very desirable properties as an industrial explosive, but its cost in the past has been prohibitive. Synthetic mannite at a reasonable cost for explosives use was the inspiration for the Atlas Powder Company's systematic research which has ended so triumphantly in Mannitol and Sorbitol. We may nitrate Mannitol, but your CHEMICAL INDUSTRIES' readers will be more interested in its use in electrical condensers where it gets valuable results unobtainable with the other polyhydric alcohols.

"As for Sorbitol, it, too, is found in Nature in minute quantities in Mountain ash berries, apples, pears, cherries and other plants. The quantities, however, are so small that Sorbitol was never available for industrial purposes.

"The availability of Sorbitol commercially has already brought about a marvelous achievement which has unleashed processes making possible the production synthetically of Vitamin C (Ascorbic acid). This vitamin has been known to occur naturally in certain plants in very minute quantities, but has never before been obtainable in a concentrated form at a reasonable price. The tiny traces found in these plant products is seen from the fact that when chemists formerly produced Vitamin C (Ascorbic acid), they could extract only about one gram from about a ton of red cabbage with the result that ascorbic acid sold for as much as $1800 a pound. Since it has been produced from Atlas Sorbitol, the price of ascorbic acid has been brought down to a small fraction of its former cost.

Suggested Uses for Sorbitol

"Industrially, we have proved up a few very different and most suggestive uses for Sorbitol. In the textile trade, as a conditioning agent, it proves of great value in printing mixtures, as a rayon size, and as a conditioner in rayon knit goods. In the tanneries, Sorbitol is used to soften skins and as an ingredient in the various finishing processes. The use of Sorbitol in printers' rollers increases the length of their use by three and imparts improved quality. It forms extremely strong emulsions with gelatin, dextrin and casein, resulting in greater mechanical strength and more permanence to changes of humidity when employed in various adhesives.

"Almost daily," Mr. Frorer concluded, "we are learning of new uses of these new products of ours—both in the field of chemical synthesis and in the formulation of chemical specialties. Naturally, we are exploring their fields of application vigorously; but others, attracted by their chemical and physical properties, especially as humectifiers, conditioners, etc., are also discovering for themselves how to use these new chemicals. Naturally, we are glad to cooperate in such development work."

New Oil Emulsion Formula

A groundnut oil emulsion for insecticidal purposes containing besides the oil, oleic acid, ammonia and water is now being used in France. This emulsion is made by mixing 500 c.c. of groundnut oil with 75 c.c. of oleic acid and then pouring the mixture slowly, with constant agitation, into a solution of 50 c.c. of ammonia in 200 c.c. of water. For use, this emulsion should be diluted with 9 times its volume of water. It is stated that all insects, the wax-covered bodies of which are resistant to ordinary aqueous liquids, are poisoned by this 2% oil emulsion.

Three Basic Automobile Polish Formulas

Discussed and Priced by Dr. Chas. F. Mason

SUCCESSIVE improvements in the "paint job" of motor vehicles—first varnish, next nitrocellulose lacquers, and now more recently the newer synthetic resin finishes—have created new problems, as well as new opportunities for the manufacturer of cleaners and polishes. Here is possibly the biggest market, certainly the most steady year-round market, and obviously a still growing market.

In no field among all the chemical specialties is the basic formula more important than in the motor car polish. Here results are quickly revealed and a poor formula is a sure killer of any re-sale value. There is probably no class of chemical specialties offered to the public in which the reaction of the user is more prompt and definite, and of which any user feels himself to be a fairly competent judge.

When automotive vehicles first made their appearance, they were finished with varnish, and the producers of polishing media followed the beaten path used heretofore in furniture polishes. With some modifications these are being used today; namely, oil polishes (with or without abrasives) followed by spirit wax coatings which can be buffed to a high lustre. With the advent of emulsifying agents, which enable the maker to introduce more water and so inveigle the public into believing that they are obtaining more for their money, these oil polishes became very bulky. The result has been the recent introduction of paste oil polishes known as cleaners which are more compact and contain waxes.

Many oil polishes were formerly simply sulfonated oils which would emulsify with water upon shaking. Others were non-drying or semi-drying oils thinned with turpentine and alcohol or a petroleum fraction. The greatest success, however, was obtained with oil emulsions which contained abrasives and a mixture of quick drying solvents, the object being to embody solvent, emulsifying, and abrasive action in one container. The formula of such a product is listed below.

Abrasive (Air Floated)	10 lbs.	$1.50
Colloidal Clay	1 "	0.07
Water	58 "	....
Mineral Oil	16 "	0.96
Naphtha	4 "	0.06
Glycerin	1 "	0.09
Perfume (Essential Oil)	0.5 "	0.15
Emulsifier (Gum or Wax)	1.0 "	0.40
Alcohol	8 "	0.64
Oxalic Acid	0.5 "	0.06
	100.0 "	$3.93

Although the prices of the raw materials were taken from quotations for one hundred pounds minimum quantities, an estimate of $0.30 per gallon is average for this type and could possibly be reduced to $0.25 in some cases. The emulsifier is usually a vegetable gum combined with colloidal clay (Bentonite) which is of a water absorbing nature and introduces a thickening action. The air floated abrasive is of an oil absorbing nature, and as a result each particle is surrounded by a film of oil and the lubricating effect aids in spreading

The presence of alcohol is open to controversy. It is detrimental to the formation of a true emulsion and has no higher solvent properties for oils, grease, etc., than the naphtha. Oxalic acid may be present to exert a mild bleaching action and glycerin to slow up the evaporation of water in which it is completely soluble. These products have not been made up as true emulsions probably because emulsifying agents not detrimental to lacquered surfaces were not so plentiful at their inception as they are today and due to the theory that a vegetable gum, which is slightly tacky in aqueous dispersion, will aid in holding to the surface when rubbing through accumulations of foreign material. Wax emulsifiers aid in making a true emulsion and are superior to gums; hence the introduction of the so-called cleaners.

Automobile Cleaners

Bees Wax	4 lbs.	$0.92
Ceresin	4 "	0.32
Naphtha	37.5 "	0.56
Stearic Acid	3.5 "	0.35
T. E. Amine	1.8 "	0.63
Water	37.5 "	....
Bentonite	12.5 "	0.87
	100.8 "	$3.65

It is apparent that this cleaner is a true solution of two soft waxes emulsified with the aid of a stearic acid soap in water to which a water absorbing abrasive has been added. Upon application to a surface, the water and naphtha evaporate leaving behind a soft film of waxes and abrasive. This film, under any conditions, winter or summer, will remain soft, thereby insuring the ultimate removal of all abrasive. This is an improvement over the type of liquid polishes which when applied in direct sunlight would dry so rapidly that in many cases white streaks were hard to remove. The presence of triethanolamine is dangerous in that if the requisite quantity is present no harmful effects need be anticipated, but a slight excess is detrimental since this substance is a very efficient paint remover. The stearates which are self emulsifiable can be substituted for this and the stearic acid with the same results in body and ease of application.

Wax Pastes

I. G. Wax O. P.	10 lbs.	$6.50
I. G. Wax V.	5 "	3.30
Carnauba Wax	5 "	2.15
Ceresin Imported	13 "	4.68
Naphtha	67 "	1.01
	100 "	$17.64

Consideration of this formula will show that after the solvent has evaporated a film of wax will remain which consists of 6 parts hard wax and 4 parts softer wax, and after buffing a brilliant lustre will result from the presence of hard wax held to the surface partly by air pressure and partly by ceresin which is still soft as a result of solvent retention which persists for many hours. Such a polish should dry hard to a film in which a clean finger will not leave a mark and which will not be tacky enough to pick up and retain road dust. It is designed to offer a protective coating for the finish underneath against the elements and vibration.

However, about the only benefit is the lustre which such a film imparts because evaporation proceeds and the waxes slowly revert back to their hard, amorphous, non-tacky form and either fall off the surface by their own weight or are shaken off by vibration. This can be improved upon by a synthetic resin oil varnish of the wiping, quick-drying type, or a water wax emulsion which will deposit a film of only hard wax which has been rendered flexible by the emulsifying agent. The application of the dry bright principle used in floor waxes to these surfaces is not now possible because the emulsifier is not completely water-proof and many are detrimental to lacquered films. However, such products may have to await development until the large automobile or specialty producers take this responsibility of aiding in the protection of goods after sale.

How NOT to Sell Packaged Plant Food

By A. M. Corbet

As a practical demonstration of how chemical specialties are finally put into the hands of the public, we sent Miss Corbet out to buy some packaged fertilizers for her house plants. She has repeated verbatim here experiences with what she vividly calls mis-merchandising. Other Inquiring Reporters in other cities will buy other chemical specialties to give our readers a change of sales experiences from the very front line of merchandising.

HOW many dollars the sales in packaged plant food specialties totals yearly, I haven't the slightest idea. But having concluded a buying tour for these products (an itinerary that included two department stores and one nursery), I am convinced that packaged fertilizers get about half the chance of being sold as an ordinary pair of shoe strings. Most certainly these sales are not going to be bolstered by present hit-and-miss methods of merchandising.

Perhaps manufacturers of these specialties are not interested in how their products are displayed or what selling arguments are advanced to push their sales. Obviously, from first-hand range, their products never get a word of recommendation from sales clerks; and to purchase a plant food that a clerk doesn't recommend—that's quite an art, I can assure you. Even more so than being persuaded to buy something you don't want.

In no case did my eye encounter what might be termed even the slightest pretense at a display of these specialties. No enticing signs called attention to "Plant Foods for House Plants." The spaces allotted to them were unworthy of any product. I wonder now why these stores carry them at all; and if, after all, since they have undertaken their sales, they don't even care to get them off their shelves?

The first New York department store I visited (one famous for its Long Island nurseries) has a display which is quite shocking. At the furthest end of the floor, two shed-like display cases, facing a freight entrance, held an array of fertilizers, insecticides, and fungicides Only the back of these cases was visible to the customer's eye, and that only after a good deal of looking. In the two cases were seven brands of plant foods, some of which I did not know even by name. Originally, they had been neatly stacked in pyramided piles, but neglect and time has tumbled some down entirely, others are partly fallen, some are upside down, while nearly every one has its own layer of dust. Some of the tin containers are even corroded. It is an unappealing sight, utterly unworthy treatment for any article of merchandise.

I snooped around to my heart's content. Nobody bothered me or asked if I wished to be waited on. I walked to the front of the floor and addressed a clerk: "I want some food for an ailing house plant."

"Yes, Madam, step this way, please."

We traversed the almost block length of the floor and without hesitation she picked up a small box of plant food in tablet form and placed it in my hand. "Twenty-five cents. Shall I wrap it up, or do you want it sent?"

I almost succumbed to this vigorous action, but I held the box while my eye roved over the other items. Then I picked up a can of nitrate concentrate which she wrested—actually grabbed—away from me, her whole attitude registering disapproval.

"Oh, you don't want that! We never sell any of this brand, and besides that's last year's stuff. Everybody buys the tablets."

Undaunted at this, I picked up another brand. This she also tried to take from me, remarking: "We never sell any of this either. In fact, we recommend only tablets."

"Well, I'll take a box of this anyhow and do a little experimenting with the two." She looked as if I were plumb crazy. "The tablets are all you'll need for house plants—are you sure you want this too?"

"Yes, I'll take it. How do you apply these tablets?"

"For an eight inch pot you use a whole tablet, and for smaller sizes a half tablet. Just make a hole in the earth; stick the tablet in; and apply water."

"How about this food?"

"Well, I really couldn't say. You can read all the instructions over when you get home."

Here, at least, I scored the victory of buying something somebody did not want to sell me. If I had wanted to buy more I couldn't have done so for quite evidently she had no faith in the products her store was retailing.

I next singled out a well known seed store on Madison Avenue. Here, a gentleman with a German accent greeted me at the door. I had no chance to roam around, for he escorted, rather, I should say, elbowed me all over.

"I have been away, and my house plants have been neglected. They need perking up. What would you advise?"

He went to a shelf built round a post in the middle of the store, and pulled down a box of the same tablets I already had purchased.

"I have some of these," I protested. "Can't you recommend something with a better food content?"

"Oh! no!" he exclaimed. "These are all we recommend now. You see, we analyzed all the various plant foods and found that these tablets have the greatest fertilizer value."

"You mean the chemical contents?"

"Exactly! In fact, we practically stopped selling other brands over a year ago."

"Well, I think I'll try something else and see for myself what it will do for my plants. How about some of this?" I picked up a nationally advertised brand of fertilizer, well known to me because of this and because I had, myself, used some on plants and found that it worked wonders.

"Oh! that we only sell in five pound bags, and that's kept in the cellar. Besides, you only need enough for house plants, that's why I recommend the tablets."

My mood being obstinate, I replied, "I'll take five pounds."

With a quizzical expression on his face, he went down cellar and returned after ten minutes with a five pound bag of bone meal.

"We have none of the other brand left—how about this bone meal? It is the most natural substitute for a fertilizer you could get."

"Are the contents as nourishing as the other brands?"

"Yes, the nitrogen content is very good; in fact, it is better than the others."

And so out and to a midtown department store. Wrong directions took me to the front basement, where I traipsed in and out of an overcrowded greenhouse department, only to learn that plant foods were kept in the garden accessories department on the far end of the floor. Here, an information clerk, perched in a special booth in the center of the garden department, indicated with a backward gesture of her hand, "They're over here somewhere."

Over here somewhere proved to be a small space, about six by twelve inches, on the end of a long table, devoted to bulbs and seeds. These were gaily wrapped in Cellophane and ribbons, and signs suggested their use as Christmas gifts. About a dozen packages of the much mentioned tablet food and three small boxes of a tablet for the preservation of cut flowers filled the space allotted for packaged fertilizers.

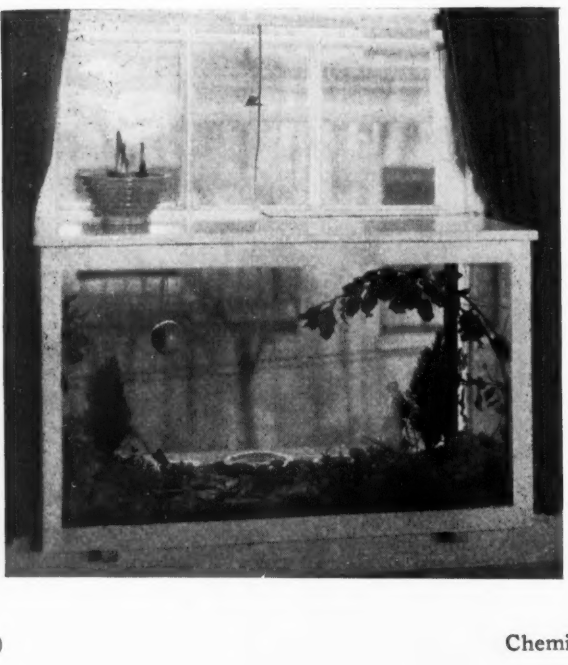
The salesman recommended the tablets, and I plied my questions again.

"These tablets are just what your plants need."

Here I got a jolt, because his directions were in opposite direction to those of the first clerk. "Well, for a six-inch pot you use about one tablet a month. Simply lay a tablet on top of the soil and pour water over it."

"Is it advisable to continue using them after the plants have shown good signs of growth?"

"Yes, and a box lasts a whole year. The contents of these tablets are 35% stronger in food value than any other brand."



"How about ——— brand? I used that once and had fine results."

"Well, you probably got a sample of that at the Flower Show, that's why you used it. We don't handle that but we have our own brand of plant food. There is so little call for it except in large quantities that it is kept in our warehouse, and aside from that, most people buy plant foods in the Spring and Fall."

My tour ended, I headed for the subway. My interest in ailing plants had vanished. My thoughts turned to the evils of uneducated and disinterested salesmanship. My pity stirred for the manufacturer of packaged fertilizer trying to build sales with such mis-merchandising help.

Anti - Frost Preparations

Markets - Formulas - Properties

A worthwhile market exists in certain of the more northerly portions of the U. S. and Canada for efficient preparations for preventing the formation of ice on automobile windshields, all types of public conveyances, and on the windows of stores. Other uses, too, for such a product will readily suggest themselves.

One of the most acceptable forms, is a paste packaged in a tube for sale through the chain stores and service stations for the motorist. For sale to department stores for their own use on display windows larger containers are, of course, required, but in any case the necessity for tight packaging must be kept in mind in choosing the container.

Decided improvement has been recently made by several manufacturers of anti-frost preparations for use on automobiles in methods of application. For example the Sleet-X Co. is marketing "Sleet-X" in the form of a windshield wiper. The preparation is contained in a bag which forms the wiper and the whole kit retails for about 35c. Others have introduced anti-frost preparations in cake form which can be attached to the windshield wiper and which dissolve slowly when water is supplied.

Fourteen methods of preventing frost on windows are listed in the literature: 1. Flame of an alcohol lamp; 2. Sulfuric acid; 3. Aqua ammonia; 4. Glycerine; 5. Aqua Regia; 6. Hydrochloric acid; 7. Benzine; 8. Hydriodic acid; 9. Boric acid; 10. Alcohol; 11. Nitric acid; 12. Cobalt nitrate; 13. Infusion of nutgalls; 14. Tincture of ferrous sulfate. For commercial preparations glycerine is usually the most acceptable.

Suggested Formulas for Experimental Purposes

Formulas	Remarks	Form of Finished Product
1. Dissolve 2 oz. C. P. glycerine in 1 qt. 62% alcohol, plus the addition of oil of amber or other similar product to correct unpleasant odor.	Not as desirable a packaging product for the automotive field as material in paste form but acceptable in some cases for large applications.	Liquid
2. Sodium hydroxide (caustic soda), palm oil and high grade rosin in the respective proportions 6½-12-1 are cooked, 30 parts of water are then added and cooking continued, 20 parts of water and 25-30 parts of glycerine are then added.	Practically a soap-making operation, rather difficult unless the operator is skilled.	Cake
3. Soft soap, glycerine and turpentine are mixed in the proportions of 65, 30, 5.	Purchase of soft soap eliminates cooking operation of formula 2 and is a simple mixing operation. Can be sold in tube form.	Paste
4. Paraffin, chinawood oil and turpentine are mixed in the proportions of 20, 10 and 70.	Makes a non-hygroscopic compound. Can be sold in tube form.	Paste

Household Specialties

Insecticide and Disinfectant Specifications

Two hundred manufacturers of insecticides, disinfectants and allied products, meeting last month at the Waldorf in N. Y. City, swept through, under the leadership of Vice-President Eddy, a highly instructive and profitable program, divided into 4 2½-hour sessions. President McCormick, recuperating from a severe illness, was unable to attend.

Illness prevented President McCormick from presiding.

Again the urgent need of more uniform specifications for the purchase of raw materials and for the sale of the finished products of the industry formed the background for much of the discussion led by Dr. Robert C. White of Philadelphia and Dr. B. G. Philbrick. President McCormick's report, read by John N. Curlett of the McCormick Co., stressed the necessity for improved quality of products and avoidance of broad claims on labels and in advertising. Secretary Wright suggested further consideration of a number of provisions of the Copeland Bill.

William B. Eddy, vice-president of Rochester Germicide, is the new president; H. M. Clark, Hess-Clark, is a vice-president.

Simon S. Selig, S. S. Selig & Co., chairman of the sanitary supplies committee, discussed in detail the hiring and training of salesmen, while Leonard B. Schwarz of Clifton Chemical reported on "What's wrong with the Sanitary Supply Business." He blamed inferior articles sold as the major problem. Other papers read included: "Water Emulsion Waxes" by Richards Jarden, president, Franklin Research; "Deodorizing Blocks" by J. L. Brenn, Huntington Laboratories; "History and Development of Sanitation and Disinfection" by Dr. Samuel C. Prescott, M. I. T.: "The Phenol Coefficient as a Measure of the Practical Value of Disinfectants" by Jack Varlay of Baird & McGuire.

A welcome note of optimism was noted in the private conversations with a number of leaders attending the convention. With last year's sales conservatively estimated at $150,000,000, and with others claiming twice this amount, outlook for '36 is bright.

A touch of humor was provided by some rather fanciful newspaper reporting work on the part of a representative of one of the papers concerning the development of a "super-bug" to end bugs, and to certain members the incident offered concrete evidence of the danger of misleading statements reaching the general public. The association voted at the meeting to continue the institutional publicity campaign authorized at the June meeting in Chicago.

Exterminators Will Meet in Cleveland

The National Association of Exterminators & Fumigators will hold its '36 convention in Cleveland at the Statler on Oct. 26-28. Date has been definitely settled so far in advance to permit the arrangement of a very complete program for the 3-day period. Feature of booth displays will be continued, for it was conclusively shown at the Fall meeting that the firms exhibiting received much from the direct contact with consumers of the chemicals shown. An added feature for '36 will be a series of clinics where those interested in direct problems will be able to enter into discussions on such subjects. The Association has adopted a code of ethics. Another innovation will be a question and answer service each month in connection with the monthly bulletin.

C. Norman Dold, of Chicago, president N. A. E. & F.

"Soapers" to Meet January 30th

Roscoe Edlund, executive secretary of the Association of American Soap & Glycerine Producers, announces that the annual meeting will be held at the Waldorf in N. Y. City, Jan. 30. It is expected that all members of the soap industry will be invited to attend.

Iowa Soap Attacks Coconut Oil Tax

Iowa Soap, Burlington, Iowa, and Camden, N. J., has taken the lead in the fight on the 3c coconut and palm oil processing taxes and is attacking in the Federal Court on the ground that it is not levied for the general public use in the U. S.

In this connection it is interesting to note that funds approximating $20,000,000 soon will be turned over to the Philippine Treasury, representing collection by this Government from the 3c import tax on coconut oil, entering the U. S. from the islands.

Payment represents collections from July 1, '34, to date and is being made in accordance with provisions of the Revenue Act.

New Products

Franklin Exterminating, Columbus, Ohio, is adding a new non-poisonous roach powder and a poison for the extermination of rodents which is harmless to other animals.

Mobile Chemical, Mobile, Ala., makers of "Shine Boy," an all-purpose cleaning cream for silver, glass, etc., is now ready to market "Foam Cleaner," a new fabric cleaner.

New Essential Oil Suppliers

K. W. Merkel, formerly with Ungerer, is now "on his own" at 50 Church st., N. Y. City, with a line of essential oils, aromatic chemicals and general line of raw materials for the chemical specialty field.

Another Ungerer official is opening up his own essential oil business. Charles Fischbeck, a V.-P., and with the organization for 25 years, is forming Charles Fischbeck & Co.

Selling Campaigns

Dif Corporation, Garwood, N. J., is using with excellent results a floor stand to dramatically tie the premium to the product. Company makes a general household cleaner for dishes, clothes, etc., and is offering a pair of silk stockings for 15 box tops and 25c. Offer is being tried in New Jersey, Philadelphia, Brooklyn and Long Island.

Climalene Co., maker of "Climalene" water softener, renews contract over the NBC (Chicago) Red Net for 13 weeks of

Snowshoe Laboratories, Portland, Ore., maker of leather dressings, is trying out national advertising with small space in 9 publications.

Colgate-Palmolive-Peet will shortly launch a new "Cashmere Bouquet" campaign next spring, using the "Avoid Offense" theme. Several national magazines are already on the schedule.

S. C. Johnson & Son, Racine paste and liquid wax producer, is adding an amateur song writer's contest on its Fibber McGee and Molly program over a 45-station NBC network.

One million samples of "Three-in-One Furniture Polish" have been distributed in reply to coupons which have appeared in magazines since last summer. Introductory packages, with display material, have been distributed to 13,000 retail outlets.

Black Flag has appointed Merz-Mihm as its Metropolitan area distributer.

New Advertising Counsel

Park Chemical, Detroit, automotive and household polishes, appoints the Simons-Michelson Co., that city, to direct its advertising account.

B. T. Babbitt, Inc., N. Y. City, has placed the advertising of Bab-O cleanser with Blackett-Sample-Hummert, Inc., N. Y. City, effective Jan. 1.

Company Briefs

S. P. Penick & Co., large factor in insecticide raw materials, is receiving much favorable comment for distributing a large quantity of reprints of "Sudden Death"—an outstanding story of reckless auto driving.

West Disinfecting reports that its Southwest factory branch at Houston is now shipping out at the rate of 48 cars of material annually. The plant has just been recently enlarged.

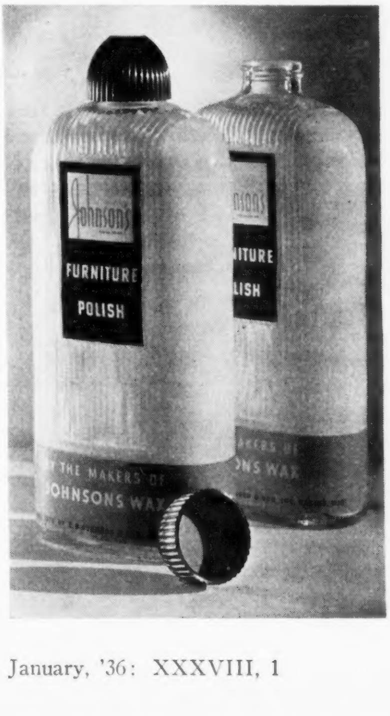
A non-drip sprayer in several models is being offered by Volume Sprayer Manufacturing Co., Tulsa.

George A. Wrisley, Allen B. Wrisley Co., is the new president of the Chicago Perfumery, Soap and Extract Association. T. E. Henshaw, Thayer Pharmacal, is V.-P., and M. B. Vance, Givaudan-Delawanna, secretary-treasurer.

S. Bayard Colgate, president, Colgate-Palmolive-Peet, one of the world's largest manufacturers of soaps, has been named a vice president of the National Association of Manufacturers.

Federal Trade Commission

Commission issues a complaint against Maurice Levine, trading as E-Z Kleener Manufacturing and other names, alleging that he represents himself as a manufacturer on the packages when, according to the complaint, he does not operate a factory.



S. C. Johnson & Son, Racine, has just placed an outstanding furniture polish package on the market. A lustrous fluted Durez cap, a clear fluted bottle through which the white polish shows, a black label and a scarlet band around the bottom—these are the ingredients. The fluting on the Durez cap makes it sparkle and also makes it easy to open when fingers are gooey, and the ribs of the bottle serve a similar function. Closure Service molded the Durez caps and the bottle is by Owens-Illinois.

Industrial Specialties

Bleaching Operations in the Laundry

Factors that influence action of bleach in the laundry washer is the subject of a new Special Report (No. 70) issued jointly by the American Institute of Laundering and Mathieson Alkali, the latter the founder of the special research fellowship on this subject. A summary of the results obtained follows:

1—Predominating influence on the bleaching activity of the bleach bath is the amount of available chlorine added to the washer.

2—Bleaching activity increases with an increase in the temperature of the bleach bath.

3—Bleaching activity increases with a decrease in the pH value of the bleach bath.

4—Within the range of temperature and pH commonly employed in the washroom, variations in temperature have a greater influence on bleaching activity than do variations in pH.

Liquid Belt Dressing Formula

A suggested liquid belt dressing formula contains beeswax 4 lb., pitch 5 lb., resin 3 lbs., neat's foot oil 13 lbs. Any quantities of finished material may be made providing the proportions remain unchanged. The beeswax is melted 1st and the other ingredients are added in the order named.

"Killing" Paint Odors with Vanillin

Overcoming paint odors is a problem receiving attention. In a circular by Dr. Henry A. Gardner, issued by the scientific section of the National Paint, Varnish & Lacquer Association, a method of comparing the odor of drying paint is given, and in addition, it is disclosed that ordinary vanillin, one part in 2,000 parts of paint, is rated very highly for deodorizing or rather changing the odor of paint to one that is more satisfactory. The vanillin is slightly higher in cost than other types of industrial perfumes. Vanillin may be dissolved in turpentine or linseed oil to make a concentrated base which can be added in the proportion referred to above when treating interior paints.

Dispersing Agent for Cement

A dispersing agent, T.D.A., manufactured by Dewey & Almy Chemical Co., Cambridge, Mass., is said to impart several radically new properties when incorporated in cement. It increases the workability of cement without lessening its ultimate strength; in fact, cements in which it is used have greater strength and more sand and gravel can be used in mixing. It keeps the fine particles from gathering in clumps and disperses each particle so that it acts as an entity in drying. It also acts as an aid in grinding cement clinkers, and imparts improved warehousing properties.

Preventing Breakage of Porcelain Insulators

Glycerine-litharge cements used in the electrical industries for such purposes as adhesion of porcelain insulators to metal supports have been found to absorb a considerable proportion of carbon dioxide. After three years, reports G. Gallo (*Ann. Chim. Applicata*, 1935, p. 122), 42% of a cement had been transformed into basic lead carbonate. Since the respective volumes of litharge and basic lead carbonate are in the ratio of 1 to 5.5, it is easily understood why breakages of porcelain insulators are frequently reported. Risk can be obviated by simply coating the surface of the cement with an impermeable varnish. British *Chemical Age*, Nov. 30, p499.

Storing Liquid Bleach

Question and Answer Column of British *The Dyer & Textile Printer* replies to inquiry as to whether or not sodium hypochlorite bleaching solution could be stored in a wooden tank by saying that a stone container would be more profitable, but if wood is used it should be larch.

broadcasts on Thursdays, 11.30-12 noon. Cannon dish towels will be offered for product carton plus 5c.

Industrial Chemical Expands

Industrial Chemical Products, Detroit, has awarded contracts for construction of a one-story fireproof addition to its plant in Bellevue ave., to cost $45,000 or more with equipment installations.

Carpenter, Houghton Head, Inspects

Major A. E. Carpenter, president, E. F. Houghton & Co., maker of specialty oils for textiles and leather, has just finished inspection trip to branch plants at Chicago and Detroit checking on new installations. Canadian subsidiary at Toronto now has a sulfonating unit.

New Company for Dry Cleaning Soaps

Atlantic Oil & Chemical Wks., 47-61 W. Gates st., Columbus, Ohio, is a new company formed to make a soap to be used in dry cleaning. Charles W. Deuser, president, Deuser, Inc., which operates the Caskey Cleaning Co. is backing the new venture.

Certain-Teed's New Officers

Certain-Teed Products has elected George M. Brown chairman of the board; Chester E. Rahr, president; and Audenried Whittemore, vice-chairman of the board.

Polishing and Staining Wood

Research department of the Wilfor Co., Wapping, Liverpool, England, has developed a new process of staining and polishing wood, which, by combining the 2 operations, is said to reduce materially the time required.

Casein Glues

Fred Holt, Jr., technical director of Brown-Bridge Mills, writes about "Casein Glues" in the December issue of *The Paper Industry*, p656. In previous articles he discussed "Animal and Fish Glues" and "Starch and Dextrin Adhesives." He summarizes the properties of starch, animal and casein glues as follows:

	Starch Glues	Animal Glues	Casein Glues
Cost	Low	Medium	High
Strength	Low	Very High	High
Water Resistance	Poor	Poor	High
Rate of Setting	Very Rapid	Rapid	Rapid
Spreading Power	Low	Medium	Very High
Viscosity	Thick to Thin	Thick to Thin	Medium
Foam	None	Very Low	Medium
Working Life	Days	Hours to Days	Hours to Days
Staining of Wood	None	None	High With Some Woods

Agricultural Specialties

Effects of Particle Size on Fertilizer Efficiency

Effects of particle size on the properties and efficiency of fertilizers is discussed in a recent Dept. of Agriculture bulletin (T. B. No. 485). In the field tests nonsegregating fertilizers with grains ranging in size from 2- to 3-mesh to 80- to 150-mesh, and dry-mixed fertilizers with the superphosphate particles only varying in size, were applied accurately and uniformly to cotton in 3 soil types for 3 seasons in South Carolina. Of the grained fertilizers 80- to 150-mesh particles produced highest yields in a majority of the 13 trials. Smallest superphosphate particles were best in every test, and the average difference in yield as between the smallest and largest particles was alone more than enough to pay for all the fertilizer used. Chemical analyses were made on the soil to which the fertilizers had been applied to determine differences in leaching and change in solubility of the fertilizer elements. Laboratory tests were also made to determine the present range of particle size in typical fertilizers and the effects of particle size on various properties of fertilizers and their behavior during handling and distribution.

Average mixed fertilizer consists almost entirely of material that will pass through a 5-mesh and be held on a 200-mesh screen. No significant difference in the distribution of particle size exists between various classes of mixed fertilizers. Double superphosphates appear to be composed of coarser particles on the average than ordinary superphosphates.

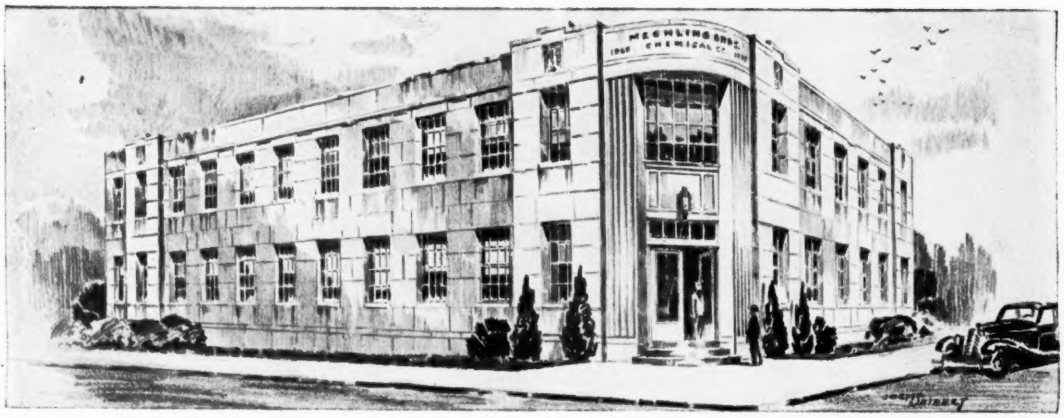
Small particles of fertilizer absorb moisture from the air and tend to cake more readily than large ones. Apparent density varies with the size distribution of fertilizer particles, and therefore the size of bag required to hold a given weight of substance depends upon its particle-size distribution.

"Black Leaf 40's" Biggest Campaign

"Black Leaf 40" '36 advertising campaign will be the largest in the history of Tobacco By-Products & Chemical. This old established Louisville agricultural insecticide manufacturer will use 12 magazines, 100 daily newspapers and a wide assortment of garden and farm journals. One or more phases of use will be advertised throughout the year, according to season. Spring flower-spraying season will be ushered in with 6 insertions in Sunday papers having garden pages, and in a list of national magazines. Use of 'Black Leaf 40" for disinfecting poultry roosts will be given special featuring in '36.

Minor Elements in Plant Nutrition

One hundred mixed fertilizer producers attended a conference at the Agricultural College, New Brunswick, N. J., on Nov. 26, at which Dr. William H. Martin, director of research, presided.



Artist's drawing of the new laboratory and executive offices of Mechling Bros., Camden, N. J. Company is one of the oldest concerns in the chemical specialty field, and in addition is a producer of silicate.

"Role of Minor Elements in Plant Nutrition" was discussed by Director Lipman. He pointed out that although many elements are required by plants, as shown by water culture and sand culture experiments, it must be remembered that such experiments do not necessarily indicate that all of these elements need be added as fertilizer. Dr. A. W. Blair discussed results that have been obtained in New Jersey with rapid plant food deficiency tests and stated that although these tests undoubtedly have value, many of the results obtained are difficult to interpret.

Dr. A. V. Tiedjens spoke on "Fertilizer and Lime Requirements for Vegetables." He presented results obtained with different forms of nitrogen, with and without lime, and with dolomite. For example, in an experiment with tomatoes a complete fertilizer deriving all of its nitrogen from ammonium sulfate produced 13.3 tons without lime. Same fertilizer used in connection with high-calcium limestone produced 16.4 tons, and, in connection with dolomite, 18 tons. Same fertilizer deriving its nitrogen from nitrate of soda and without lime produced 13.7 tons.

Efficiency of Extracts from Red Squill

Raticides prepared with toxic extracts made from red squill powder are efficient, reports Robert E. Buck and C. R. Fellers, Massachusetts State College, Amherst, Mass., in *Industrial & Engineering Chemistry*, Dec., p1497. Methyl and ethyl alcohols are the most efficient solvents for the extraction. Extracts prepared with the Soxhlet extraction apparatus are more toxic than those prepared by shaking or stirring. Wheat bran is a suitable and inexpensive carrier for the dried extract. Short extraction periods remove more toxic material from coarsely ground powder than from finely ground. Rats, which do not receive a lethal dose of red squill preparations in the initial feeding, will repeatedly consume more baits containing extracts. This is not true of powder baits. Toxic extracts can be prepared on a large scale by a percolation method. Field tests using baits containing extracts from red squill demonstrate their efficacy as raticides.

Locusts as Fertilizer

Locusts have been turned into profitable use in Argentina by the Government's agricultural agency. After being gathered and dried, they are ground into locust meal fertilizer, analysis of which shows that it contains 9.66% nitrogen and 12.40% fats. About three tons of locusts are required to produce one ton of meal.

Lead Arsenate for Earthworms

Lead Arsenate in turf treatment to eliminate earthworms is the subject of extensive work at the St. Ives' Research Station, Bingley, Yorkshire, England. Results so far indicate that applications at the rate of 1½ oz. to 2 oz. per sq. yd. is the most effective for ordinary circumstances.

Weed Killer Formula

Weed killing through the application of a solution of ammonium sulfate and soft soap in the proportions of 1 lb. of sulfate, ½ lb. of soap, and 1 gal. of water is proving effective in England.

Pridmore with Potash Institute

The American Potash Institute reports the appointment of R. G. Pridmore as assistant agronomist at its headquarters in the Investment Bldg., Washington, D. C.

Mr. Pridmore comes to the Institute from 5 years' service as assistant agronomist on the staff of the Georgia Agricultural Experiment Station where his work included the management of fertilizer experiments for cotton on the important soils of Georgia. He is a graduate of Clemson College and after receiving his degree in '29 was assigned to assist in field experimental work with fertilizers at the Sandhill Experiment Station near Columbia, South Carolina.

Mr. Pridmore added greatly to his knowledge of fertility problems in the South when in '30 he became engaged with the Superphosphate Institute of Washington, D. C., as assistant field agronomist conducting fertilizer experiments on cotton in South Carolina, Georgia, and Alabama.

Ausley Selling for Potash Co. of America

Paul C. Ausley is now associated with Potash Co. of America in sales work. He will make his headquarters, along with Stanley H. Ellis at Atlanta. He will offer his services and cooperation to fertilizer manufacturers of South Carolina, Georgia and Florida.

Chipman Chemical's New Advertising Agency

Chipman Chemical, Bound Brook, N. J., maker of weed killers, insecticides and fungicides, has appointed Charles Dallas Reach Co., Jersey City, as its advertising agency.

Notes on Men in the Industry

Speaking on "A Public Policy as to Open Price Plans," Mr. Brand stated last month before the American Marketing Society, that without NRA a price filing plan wisely administered is still desirable in many industries and an almost indispensable factor in the distribution process of certain industries.

R. N. Chipman, head of Chipman Chemical, Bound Brook, N. J., is the new chairman of the Agricultural Insecticide & Fungicide Association. The association has engaged a full-time secretary and opened headquarters at 285 Madison ave., N. Y. City.

Study in Fertilizer Consumption

The National Fertilizer Association has reprinted from the proceedings of the last convention "A Survey of Plant Food Consumption in the U. S. for the Year Ended June 30, 1934." This is the most complete survey of fertilizer consumption by states and by grades that has ever been made.

November Fertilizer Tag Sales

November tag sales are relatively unimportant, usually accounting for only about 2% of the year's total in the South and less than 1% in the Midwest. Consequently the 2% decline from November of last year reported by the 12 Southern states and the 86% increase in the Midwest are without significance. Florida, only one of the 17 states in which November sales are of much importance, registered a decline of 22% from November, '34.

For the 1st 11 months gain in tag sales over the corresponding period of last year has amounted to 12% for the 17 reporting states. Florida and Arkansas are the only 2 states to show declines, but these decreases were much more than counterbalanced by the gains in the other Southern states, with the result that the South as a whole showed an 11% rise. The 3 largest consuming states—Carolinas and Georgia—have shown good increases.

A sharper rise has taken place this year in tag sales in the Midwest than in the South. The 5 states in the aggregate have shown a 23% rise for the 11 months, with a substantial upturn occurring in each state.

Miscellaneous Notes

Recent U. S.-Canadian tariff trade pact reduces Canadian import rate on mixed fertilizers from 10 to 7½%.

Everglades Fertilizer reports a heavy purchasing by farmers this season in South Florida.

Store-developed Packages

The National Retail Dry Goods Association, at its silver-anniversary meeting at the Pennsylvania in N. Y. City, Jan. 20-24, will present a display of store-developed packages.

Says a formal announcement: "The widening interest in the development of private brands among retailers is expected to lend great value to the clinic; and, as a further step in the analysis of the subject, the N. R. D. G. A. is planning a special session on 'The Development of Private Brands in Retail Stores.'"

Packaging, Handling and Shipping

¶Details of the 6th Packaging Exposition Announced—Color Books for Designers—Rates for Interstate Truck Transportation—Traffic League Meets—

Details of a comprehensive program of meetings, clinics and round table discussions on current problems of outstanding importance in packaging, packing and shipping, to be held in conjunction with the 6th Packaging Exposition at the Pennsylvania, N. Y. City, Mar. 3 to 6, inclusive, are announced by Alvin E. Dodd, executive vice president of the American Management Association, sponsoring organization for the exposition and concurrent conferences.

First 2 days of the 4-day program will be devoted to problems of the unit package, while the 2 remaining days will be given over to the major aspects of packing and shipping. In addition, according to Mr. Dodd, plans are well advanced for a special session concerned exclusively with packaging machinery problems.

Opening the 1st meeting at 9:45 Tuesday morning, Mar. 3, will be an address, "The Purposes of the Package," followed by discussion. Two more talks, "Family Group of Packages" and "Noticeable Trends in Package Design," each followed by discussion, will complete the morning session. The afternoon will be devoted to 2 round table meetings held concurrently, on "Protective Qualities of Materials, Lacquers, Wax, Varnishes, Foil, Cellulose Film, etc." and "Point of Sale Advertising—Packaging Fallacies or Fetishes." Both will begin as luncheon meetings.

"Tackling a Redesign Job" will be the 1st subject for the general conference Wednesday morning, Mar. 4, to be followed by 2 addresses, "The Relation Between Advertising and the Package" and "Packaging Flexible Materials—Textiles, Rubber Products, etc." Each address will be followed by general discussion. The afternoon session will be inaugurated with the Irwin D. Wolf Award luncheon, at which time presentation of the Wolf Trophy and Awards for Distinctive Merit in Packaging will be made.

Following the luncheon there will be presented a general unit package clinic, organized on a basis of maximum attractiveness and representing a considerable departure from clinics of past years. Clinic will be conducted by a committee of 7 persons representing different divisions responsible for making and selling packages, for example, designer, plate maker, paper and board manufacturer, printer, advertiser and merchandiser. Three types of packages will be presented: tin, paper and drug store.

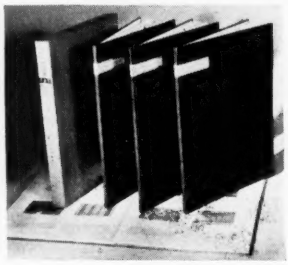
With the Thursday morning session the packing and shipping groups will take over the program, opening the meeting with an address on "The Purchasing Agent Selects Shipping Containers." Two more addresses, "Transportation Problems in Connection with the Handling of Containers" and "Value of the Compression Test in Determining Strength of Boxes," will conclude the session. Each address will be followed by discussion.

The afternoon session will be devoted to 2 round table luncheons held concurrently, on the subjects "Containers for and Packing Canned Goods and Other Articles not Requiring Interior Packing" and "Containers for and Packing Articles Requiring Interior Packing."

Opening address for the session on Friday, Mar. 6, final day of both the conference and exposition, will consider "The Package is Finished—So How Will the Consumer Receive it in Good Condition?" Following this address there will be held a general packing and shipping clinic. Packages to be presented for consideration at this clinic will include plywood and wirebound crates; good and bad wooden crates; unit packages; corrugated and solid fibre boxes for a variety of different products. All will be discussed by authorities, from the standpoint of laboratory design, printing, shipping, transportation and consignee.

Three Monographs on Color

International Printing Ink's research laboratories cooperated with Rudolph Ruzicka to produce 3 monographs on color, 1. Color Chemistry, 2. Color as Light, 3. Color in use. Monographs advance no new "theory" of color, but do contain several recently uncovered scientific facts about color. They emphasize need for more accurate measurement and specification of color, and explain a new scientific color language that is rapidly coming into international use.



It introduces a new scientific color analyser—the Spectrophotometer, invented by Dr. Arthur C. Hardy of M. I. T., and recently made by G. E. It explains laws for color in use which govern visibility, legibility, power, etc. It is a valuable addition to the library of the package designer, etc.

Interstate Truck Transportation Rates

National Rates and Tariffs Committee of the American Trucking Associations has decided to draft a national freight classification of commodities applicable to all interstate motor truck transportation.

Highlights of Traffic League Meeting

The National Industrial Traffic League held its 28th annual meeting at Chicago recently.

Highlights among the work accomplished were the initiation of the move to organize and train a vast national committee, the object of which will be to combat government ownership of the railroads; and the restatement of principles on which the shippers believe regulation of motor vehicle transportation should be based.

Close up view of the new Miller bottle wrapper. While it will not wrap all bottles it will wrap many sizes of flat bottles of the type shown in the accompanying illustration.

New Products—New Packages

DuPont's finishing division develops new primer for automotive refinishing—"Preparakote." Forms an adhesive bond, acts as a filler, can be dry-sanded in four hours after application.

Imperial Paper & Color of Glens Falls, N. Y., introduces a new wallpaper cleaner.

The "family package" idea has been splendidly carried out by Gulf Refining in the design of containers for its wide and varied line of chemical specialties. Top band is dark blue, with the name of the product in white lettering, while the lower row of lettering is in orange. Lower band is white, upon which the familiar orange disk has been centered.

Container Experts Face the Camera

Leading packaging experts of the Manufacturing Chemists' Association, gathered at Atlantic City recently for a conference, were finally persuaded to face the camera. At the right, the Carboy Committee: Top row, J. M. Loomis, Gayner Glass, guest; William Colver, J. T. Baker Chemical; W. N. Watson, M. C. A. secretary; John M. Gayner, Gayner Glass, guest; D. V. Rintoul, Monsanto, guest; bottom row: C. P. Beistle, Bureau of Explosives; Col. Guy E. Carleton, also of the Bureau; M. F. Crass, Grasselli; T. P. Callahan, Merrimac; W. B. Sherry, General; R. W. Lahey, Cyanamid. Below, left, the Steel Barrels and Drums Committee: Top row, Frank D. Goll, Aluminum Co., guest; R. P. Dreckelman, Pressed Steel Tank; M. F. Crass; H. V. Churchill, Aluminum Co.; W. B. Sherry, General; R. W. Lahey; H. M. Daggett, U. S. I.; Bottom Row: Col. Carleton; D. G. Stewart, duPont; T. P. Callahan; W. N. Watson; D. V. Rintoul, guest. Right, the Poisonous Articles and Miscellaneous Packages Committee: Top row, W. B. Sherry; H. F. Suiter, Merck, guest; J. H. Maget, Merck; R. W. Lahey; Thomas Thompson, Pfizer; D. V. Rintoul, guest; and W. N. Watson; bottom row, C. P. Beistle; Col. Carleton; M. F. Crass; T. P. Callahan; Thomas O'Donnell, Mallinckrodt.

The Chemical Specialty Field*
comes into its own . . . . .

With the introduction in this issue of a Chemical Specialties Department, we give proper recognition to the importance of this large group of chemical consumers.

In this section will appear articles discussing the manufacturing, selling, advertising, packaging and shipping problems of the manufacturers of household, industrial and agricultural specialties.

In each issue will be reproduced the chemical specialty trade-marks and patents.

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Cements
Packaged Dyes
Dry Cleaning Compounds
Janitor Supplies
Textile Specialties
Leather Specialties
Photographic Specialties
Paint Removers
Laboratory Supplies
Platers' Supplies
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Soaps
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Barber Supplies
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351,067
DUXSEAL

356,637
Marvelite

360,811
BISMUTH VIOLET

TABLE ROCK LABORATORIES, INC.

362,155
WALDAN

362,411
EVERY PACKAGE IS FERRO ENAMEL FERRO CHECKED

363,966
FERROCARBO

364,639
PUREX

365,534
Mash-Nic

367,416
PROTEXALL

367,696
CODI'S RED STAR for WASHING AND BLEACHING

367,794
FONDO

368,622
PERM-A-GLO

368,844
STANDARD TEX PRODUCTS

368,868
MULTI MULCH

369,112
VISTANEX

369,201
MURDER

369,587
RED HEAD CRYSTALS

369,610
CLO-RUBBER

369,636
Vesfume

369,637
VESPRA

369,669
CADET

Trade-mark Descriptions†

351,067. Johns-Manville, N. Y. City; filed May 8, '34; for plastic sealing compound for ducts, etc.; use since Apr. 3, '34.

356,637. Eldridge W. Quinlan, Chicago; filed Oct. 1, '34; for compound adapted to produce afterglow and to emit visible light rays; use since Mar. 1, '32.

360,811. Table Rock Labs., Inc., Greenville, S. C.; filed Jan. '28, '35; for solution and ointment of antiseptic properties; use since June, '28.

362,155. Walter Becker, Jr. (Waldan Mfg. Co.), Racine, Wis.; filed Mar. 1, '35; for paint renewer; use since Jan. 24, '35.

362,411. Ferro Enamel Corp., Cleveland; filed Mar. 12, '35; for zinc oxide and mineral coloring oxides for vitreous enamel; use since Sept. 11, '34.

363,966. Carborundum Co., Niagara Falls; filed Apr. 19, '35; for silicon carbide as addition agent in metals; use since Dec. 17, '34.

364,639. Purex Corp. Ltd., Los Angeles; file May 7, '35; for general cleanser and a bowl cleanser; use on general since Oct. 10, '23, on bowl since March, '31.

365,534. Tobacco By-Product & Chemical Corp., Louisville, Ky.; filed May 28, '35; for poultry and veterinary insecticides and parasiticides; use since Apr. 30, '35.

367,416. Leon I. Stein, Philadelphia; filed July 17, '35; for colorless waterproofing of construction materials; use since May 1, '34.

367,696. James Codispoti (Codi Labs. Co.), Pittsburgh; filed July 25, '35; for bleach, germicide, disinfectant, and cleanser; use since Jan. 1, '31.

367,794. Kepec Co., Milwaukee; filed July 29, '35; for leather dressing; use since Jan. 15, '35.

368,622. Fuld Bros., Baltimore; filed Aug. 23, '35; for waxes used in floor treatment; use since June 1, '35.

368,844. Sam Flinker (Standard Tex & Kalsomine Co.), Brooklyn; filed Aug. 30, '35; for plaster composition in finishing interior building walls; use since Mar. 1, '31.

368,868. Lou R. Strauss, Jr., N. Y. City; filed Aug. 30, '35; for mulch and fertilizing top dressing for soil; use since Aug. 1, '35.

369,112. Standard Oil Development, Linden, N. J.; filed Sept. 7, '35; for compounding agent in rubber, plastics, coatings, etc. and for waterproofing; use since July 19, '35.

369,201. Morton G. Neumann (Valmor Products Co.), Chicago; filed Sept. 11, '35; for insecticides and rodent exterminators; use since Nov. 6, '29.

369,587. Red Head Products, Inc., Cedar Rapids; filed Sept. 21, '35; for drain pipe cleaners and water softener crystals; use since Aug. 4, '34.

369,610. Harrington Paint Co., East Cleveland; filed Sept. 23, '35; for industrial paint; use since Aug. 21, '35.

369,636. Vestal Chemical Co., St. Louis; filed Sept. 23, '35; for insecticide and fumigant; use since Aug. 1, '34.

369,637. Vestal Chemical Co., St. Louis; filed Sept. 23, 1935; for insecticide; use since Aug. 1, '34.

369,669. Whittemore Bros. Corp., Cambridge, Mass.; filed Sept. 24, '35; for dressings for shoes, leathers, leather fabrics, etc.; use since Dec. 31, '00.

Chemical Specialty Patents*

Production of a skin protecting coating composition, drying to a soft, pliable film, with the following composition: a saponaceous solution comprising about 1600 parts by weight water, 288 parts sodium stearate, 1155 parts glycerine, 906 parts sodium silicate, and one part lemenone. No. 2,021,131. Omer McDaniel to Mountain Varnish & Color Works, Inc., both of Toledo, Ohio.

Production of substantially neutral watermarking composition, in emulsion form and of printing ink consistency, containing 8% to 20% by volume Canadian balsam, 5% to 17% turpentine, 8% to 25% finely divided mineral matter, and 12% to 30% castor oil, emulsified with alkaline aqueous borax solution, and containing acid and alkali reactive, colorless signalling substance. No. 2,021,141. John C. Boyer to National Listing Exchange both of Los Angeles, Cal.

Manufacture of veneered, compressed densified, and hardened stone-like panel unit which includes proportions of Portland cement, asbestos type fibers for reenforcement, all covered with wood veneer secured to surface by adhesive, and a water-impermeable and alkali-resistant material. No. 2,021,348. Charles J. Beckwith, Brooklyn, and Raymond V. Parsons, N. Y. City, to Johns-Manville Corp., N. Y. City.

Production of a soluble, permanent penetrating fluid consisting of 60% kerosene, 20% sulfonated castor oil, and 20% sulfonated coconut oil neutralized by rosin soap; mixture stabilized by alcohol. Excess alcohol will cause separation of components at certain concentrations. No. 2,021,448. Dudley K. French, Winnetka, Ill.

Production of protein foodstuff coloring or tinting material, comprising reaction product of animal blood haemoglobin and mono-sodium glutamate. No. 2,021,621. Hugh E. Allen and Albert G. McCaleb, Evanston, Ill.

An artificially colored, weather resistant building material consisting of a base covered with bituminous coating in which mineral granules are partially embedded, exposed surfaces of the particles being coated with a coloring medium and an insolubilized silicate fixing agent. No. 2,021,716. Orin R. Douthett, Perth Amboy, N. J., to The Patent & Licensing Corp., Boston, Mass.

A grease and water-proofing composition for paper comprising water dispersion containing rubber latex, casein, modified starch, a filler, hygroscopic plasticizing material, and about 4.7% shellac drying to produce flexible nontacky coating. No. 2,021,947. John E. Schopp, Oak Park, Ill.

A fire extinguishing mixture, self propelling, containing a hydrocarbon fluorine derivative and chemical decomposed by heat to form extinguishing gases. No. 2,021,981. Francis R. Bichowsky, Washington, D. C., to General Motors Corp., a corp. of Del.

Production of disinfecting and preserving agent comprising mixture of a formic acid addition compound with an alkali metal salt of formic acid. No. 2,022,139. Georg Meder, Munster-am-Taunus, and Erich Eggert, Frankfort-am-Main, Germany, to I. G., Frankfort-am-Main, Germany.

Preservation of vegetable fiber material by including one or more water-insoluble borates, and one of following: acenaphthene, fluorene, anthracene, phenanthrene, carbazole, or a tar acid. No. 2,022,231. Francis E. Cislak to Peter C. Reilly, both of Indianapolis, Ind.

Production of spray composition including a low viscosity oil as spraying agent and a carrier for the oil, the carrier being ineffective as an insecticide. No. 2,022,246. Frank Floyd Lindstaedt, Oakland, Cal., to Hercules Glue Co., Ltd., San Francisco, Cal.

Process for stain removal by treating stain with aqueous solution containing a chlorite, either alkali metal or alkaline earth metal, and either oxalic acid or an oxalate. No. 2,022,262. James F. White, Niagara Falls, N. Y., to The Mathieson Alkali Works, Inc., N. Y. City.

An adhesive carbon paper comprising a base membrane upon which is first layer of soluble adhesive material and second layer of the transfer ink. No. 2,022,276. Harold W. A. Dixon, Hollis, and Robson S. Moore, Great Neck, N. Y., to Columbia Ribbon & Carbon Manufacturing Co., Inc., Glen Cove, N. Y.

* Patents covered in this issue include those appearing in the *U. S. Patent Gazettes*, Nov. 19 to Dec. 17.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, Dec. 3 to Dec. 24.

Specialty Patents (Continued)

A waterproofing composition made up as follows: 4 parts refined paraffin wax, 2 parts paracoumarin resin, one part white beeswax, and 4 parts aluminum palmitate. This is dissolved in xylol and carbon tetrachloride present in proportions about 3 to one. No. 2,022,405. John B. Cleaveland, Short Hills, N. Y.

Method of preventing blistering of roofing using an asphalt-saturated felt base on which is dusted an inert powder, then coated with air-blown asphalt. No. 2,022,429. Charles J. Merriam, Winnetka, Ill., to Stephen G. Wright, Chicago.

Production of moisture-proof material comprising sheet of non-fibrous and smooth surface material having thin moisture proof coating deposited from varnish containing a wax and a film forming substance. No. 2,022,490. William Hale Charch, Buffalo, N. Y., to Du Pont Cellophane Co., Inc., N. Y. City.

A masonry weatherproofing composition used as filler for cracks, etc., comprising a mixture of waxeous substance and a solid, inert mineral material. No. 2,022,547. Perry M. Moore, Bloomfield, N. J.

Production of a new liquid fertilizer composition containing urea, ammonium nitrate, and fairly large quantities of ammonia, liquid as a whole containing one solid in excess of complete saturation. No. 2,022,672. Walter H. Kniskern, Prince George County, Va., and Charles K. Lawrence, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Production new liquid fertilizer composition containing urea, fertilizer salt of a strong inorganic acid, and fairly large amount of ammonia, the liquid containing at least one of urea or salt components in excess of saturation. No. 2,022,673. Walter H. Kniskern, Prince George County, Va., and Charles K. Lawrence, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Production new liquid fertilizer composition containing urea, a nitrate, and fairly large amount of ammonia, the liquid containing either urea or the nitrate present in excess of saturation, in absence of the other component. No. 2,022,674. Walter H. Kniskern, Prince George County, Va., and Charles K. Lawrence, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Production ammoniacal, liquid fertilizer composition containing urea, calcium nitrate, and fairly large amount of ammonia, liquid containing either urea or calcium nitrate dissolved in excess of saturation, in absence of other solid. No. 2,022,675. Walter H. Kniskern, Prince George County, Va., and Leonard V. Rohner, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Production new liquid fertilizer composition containing urea, a potassium salt, and substantial quantity of ammonia, containing at least one solid present in excess of saturation in absence of other solid. No. 2,022,676. Walter H. Kniskern, Prince George County, Va., and Charles K. Lawrence, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Production urea composition suitable for use with a solid, acidic fertilizer material, containing product derived from urea synthesis, urea, ammonia, carbon dioxide, and water. No. 2,022,677. Walter H. Kniskern, Petersburg, Va., and William C. Klingelhoefer, Syracuse, N. Y., to Atmospheric Nitrogen Corp., N. Y. City.

Process making buttons from casein by extrusion and treatment of casein material. No. 2,022,895. George Morrell, Muskegon, Mich., to George Morrell Corp., Muskegon Heights, Mich.

Production of bronzing ink drying vehicle containing rosin oil obtained by heating rosin and an ester of polyhydric alcohol in presence fuller's earth, and containing also a softening agent. No. 2,022,974. Robert C. Palmer and Paul O. Powers, Pensacola, Fla., to Newport Industries, Inc., Milwaukee, Wis.

Production fly-repellent livestock spray containing mineral oil and pine oil repellant, both boiling within about the same range. No. 2,023,140. Gideon John Malherbe, Martinez, Cal., to Shell Development Co., San Francisco, Cal.

Production sponge rubber sheet material having broken cells which are filled with fertilizer, insecticides or plastic fillers. No. 2,023,270. Albert C. Fischer, Chicago.

Production bituminous emulsion consisting of asphalt, colloidal solution of colloidal hydrous magnesium silicate with water, a solution of acetic acid, and water. No. 2,023,540. Robert K. Painter, Los Angeles, Henry H. Moreton, Santa Monica, and Charles W. Hill, South Pasadena, Cal.

Production flavoring material comprising solution of diacetyl and another diketone. No. 2,023,877. Albert K. Epstein and Benjamin R. Harris, Chicago.

(Specialties Patents concluded on the following page)

369,779
EL—SIXTY

369,780
PERFLECTOL

369,938
mel-O-wax

370,072
RITE-WAY

370,127
Crusto-Celic

370,282
VITA-VAR

370,423
FUSE-A-LUM

370,424
GLOLASTIC

370,435
CASENITE

370,448
Tripo-Film

370,506
SUPER-KLEAN

370,570
REXOID

370,572
PENNANT

370,573
INVADER
ASPHALT ROOFING

370,576
DEFIANCE

370,577
WATCO

370,578
ENSIGN

370,579
WARRIOR

370,580
VIDETTE

370,651
PAS-T-LASTIK

370,665
KRAXTAY

370,808
TOP NOTCH

370,838
PYROSPAR

369,779. Rubber Service Labs. Co., Akron; filed Sept. '27, '35; as vulcanization accelerator in rubber curing; use since June 4, '35.
369,780. Rubber Service Labs. Co., Akron; filed Sept. 27, '35; as antioxidants in rubber production; use since Aug. 8, '35.
369,938. Vitalex Process Co., Philadelphia; filed Oct. 2, '35; compounds for polishing and lubricating leather; use since Aug. 1, '35.
370,072. Cardinal Labs., Inc., Chicago; filed Oct. 7, '35; for furniture polish and floor wax; use since June, '34.
370,127. Sterling Products Co., Easton, Pa.; filed Oct. 7, '35; for preparation recommended as a sour for wet cleaning; use since July 20, '34.
370,282. Vita Var Corp., N. Y. City; filed Oct. 11, '35; for dry, paste, and ready mixed paints and paint materials; use since Sept. 26, '35.
370,423. Patterson-Sargent Co., Cleveland; filed Oct. 16, '35; for dry, ready mixed paints, paint enamels, stains, etc.; use since June 19, '35.
370,424. Patterson-Sargent Co., Cleveland; filed Oct. 16, '35; for dry and ready mixed paints, paint enamels, varnishes, stains, etc.; use since Sept. 6, '35.
370,435. Sherwin-Williams, Cleveland; filed Oct. 16, '35; for paints and paint materials; use since Sept. 1, '34.
370,448. Agfa Ansco Corp., Binghamton, N. Y.; filed Oct. 17, '35; for sensitized photographic film; use since Sept. 25, '35.
370,506. Hall Hardware Co., Minneapolis; filed Oct. 18, '35; for cleaning and polishing oils for floors and furniture; use since Jan. 2, '33.
370,570. Ruberoid Co., Bound Brook, N. J., and N. Y. City; filed Oct. 19, '35; for asphalt composition roofing; use since '10.
370,572. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '14.
370,573. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '15.
370,576. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '15.
370,577. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '15.
370,578. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '20.
370,579. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '24.
370,580. Ruberoid Co.; filed Oct. 19, '35; for asphalt composition roofing; use since '24.
370,651. Charles P. Coscia, Pittsburgh; filed Oct. 22, '35; for adhesive paste; use since Feb. 1, '35.
370,665. Marietta Paint & Color Co., Marietta, Ohio; filed Oct. 22, '35; for crack and crevice filler; use since June, '34.
370,808. Lehon Co., Chicago; filed Oct. 25, '35; for asbestos siding shingles; use since Mar. 6, '35.
370,838. Tennessee Mineral Products Corp., N. Y. City; filed Oct. 26, '35; for pyrophylite and feldspar; use since Oct. 18, '35.

Archer Joins Permutit

Frank V. Archer joins The Permutit Co., manufacturers of water conditioning equipment, as field supervisor, according to an announcement by Oliver P. Harris, manager of domestic sales. New official's headquarters are in Kansas City, Mo.

345,873

OPALO

368,264

SERVICE QUALITY MERCO

369,841

357,256

OLD STAND BY

368,603

TEXITOL

369,933

GYNOJELL

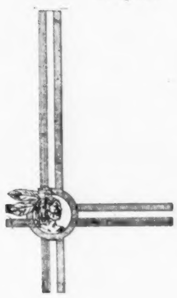
357,887

„AMCHEM"

368,860

PAR-TOX

370,074



362,409

EVERY PACKAGE IS FERRO CHECKED
FERRO ENAMEL

369,451

THERM-O-BESTOS

370,406

GRANOPHOS

369,520

VISKOPLUS

366,763

AJAX PLUS

370,407

GOLDBOND

366,865

Liquid

369,557

fael

370,457

OXYFUME

345,873. Henry L. Frazier (Opalco Lab), McKeesport, Pa.; filed Jan. 10, '34; for cleaning tile or textile surfaces; use since Dec. 1, '31.

357,256. Louis Sappanos Co., Chicago; filed Oct. 18, '34; for ready mixed paints, varnishes and paint enamels; use since Jan. 1, '18.

357,887. American Chemical Paint Co., Ambler, Pa.; filed Nov. 5, '34; for electrolytes; use since Aug. 17, '34.

362,409. Ferro Enamel Corp., Cleveland; filed Mar. 12, '35; for pills used in testing concentration of pickling solutions and the like; use since Sept. 11, '34.

366,763. Commercial Solvents, N. Y. City; filed June 28, '35; for alcoholic anti-freeze solutions; use since June 19, '35.

366,865. The Liquid Carbonic Corp., Chicago; filed July 1, '35; for solid carbon dioxide; use since Aug. 19, '34.

368,264. Merchants Chemical Co., N. Y. City; filed Aug. 13, '35; for laundry blue, laundry starch, ink remover, and disinfectant; use since May 18, '35 on blue, Nov. '29 on starch, July 26, '35 on ink remover, and Nov. '30 on disinfectant.

368,603. Carbide & Carbon Chemicals, N. Y. City; filed Aug. 23, '35; for industrial detergents; use since July 22, '35.

368,860. Ira Parker & Sons Co., Oshkosh, Wis.; filed Aug. 30, '35; for chemical wood preservative; use since Jan. 12, '33.

369,451. Johns-Manville, N. Y. City; filed Sept. 18, '35; for thermal insulation; use since July 9, '35.

369,520. Advance Solvents & Chemical Corp., N. Y. City; filed Sept. 20, '35; for naphthenate to increase viscosity of drying oils; use since Oct., '30.

369,557. American Chlorophyll Co., Washington; filed Sept. 21, '35; for coloring material used with transparent or translucent substances to absorb light of selected wave lengths; use since June 10, '35.

369,841. William Cooper & Nephews Inc., Chicago; filed Sept. 30, '35; for insecticides; use since 1851.

369,933. Max Silver (Gynae Research Labs.), N. Y. City; filed Oct. 2, '35; for lactic acid jelly preparation; use since June, '30.

370,074. American Gypsum Co., Port Clinton, Ohio; filed Oct. 7, '35; for line of wall board, insulation, plasters, finish limes, etc.; use since Sept. '35.

370,406. American Chemical Paint Co., Ambler, Pa.; filed Oct. 16, '35; for acid solutions used to rust proof metals; use since Dec., '34.

370,407. E. O. Ames & Son, Omaha, Neb.; filed Oct. 16, '35; for oil preparation used in leather industries as preservative and lubricant; use since Oct. 1, '30.

370,457. Carbide & Carbon Chemicals Corp., N. Y. City; filed Oct. 17, '35; for fumigating compositions; use since Sept. 13, '35.

Non-members of the National Fertilizer Association will no longer receive the valuable *Fertilizer News*. For 2c a ton on bagged mixed goods producers may join the association.

The Dependable Fertilizer has just been formed at Rocky Mount, N. C.

Glue base consisting of corn starch in powdered form and containing agent capable of releasing oxygen, another capable of liquifying starch, and a urea to serve as liquifier and stabilizer in retarding evaporation of water from glue after application. No. 2,023,973. Gordon G. Pierson, Lansdale, Pa., to Perkins Glue Co., a corp. of Del.

Production fumigants having varying compositions but containing solidified carbon dioxide as main ingredient. No. 2,024,027. Richard T. Cotton and Harry D. Young, Washington, D. C.; dedicated to Government and the People of the U. S. A.

Preparation of a glue by drying glue liquor which includes covering of liquid glue particles with granulated dried glue. No. 2,024,131. Roy C. Newton and Frank L. De Beukelaer to Industrial Patents Corp., all of Chicago.

Production deodorant suitable as liquid spray comprising zinc sulfocarbolate in an aqueous vehicle as the active agent, starch as a binder, and glycerine as a hydroscopic agent. No. 2,024,145. Max Cline, Glen Falls, N. Y., to International Paper Co., N. Y. City.

Use of aqueous dispersion containing dispersed rubber and rubber solvent for attaching rubber soles to shoes. No. 2,024,235. Alexander D. MacDonald, Malden, Mass., to Boston Blacking & Chemical Co., Boston, Mass.

Method of attaching leather soles to shoe bottoms using solution of low viscosity rubber in an organic solvent. No. 2,024,236. Alexander D. MacDonald, Malden, Mass., to Boston Blacking & Chemical Co., Boston, Mass.

Use of carnauba wax on glass polishing tools. No. 2,024,303. Theodore E. Obrig, Greenwich, Conn., to Gall & Lembke, Inc., N. Y. City.

Solution for sterilizing aluminum articles comprising water-soluble alkali metal di-silicate and available chlorine. No. 2,024,755. Lamont J. Benson, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh.

Poultry lice exterminator for use on perches comprising a non-volatile, sticky, adherent fluid containing free nicotine and corn oil. No. 2,024,895. Arthur H. Teigen, Madison, Wis., to Pratt Food Co., a corp. of Pa.

Production of absorbefacient for a dry cleaning solvent containing about 50% true mahogany sodium sulfonate, 25% oleic acid and 25% naphtha. No. 2,024,981. Warren T. Reddish to Emery Industries, Inc., both of Cincinnati, Ohio.

Fels' New Soap Chips

Fels & Co., Philadelphia, makers of Fels naptha soap, will begin early in '36 its 1st black-and-white daily newspaper advertising campaign in more than 20 years, it was announced Dec. 26 by Cyril G. Fox, sales and advertising manager of the company. Campaign will introduce new Fels naptha soap chips, described as the only soap chip containing naphtha.

Merchandising material will be provided to back up the advertising campaign. Material includes a window poster showing the new package and a package price card. Booklets are also being distributed to grocers to be used with a counter display. Advertising of Fels-naptha soap will continue on a larger scale than previously.

Distribution of a bonus this week to all employes of Fels-Naptha Soap, representing a substantial percentage of their yearly earnings, was announced Christmas Eve by Samuel S. Fels, president.

"This extra distribution serves 2 purposes," said Mr. Fels. "First, it provides a Christmas bonus for the employes, when it gives them opportunity to get the most out of the holiday season. Equally important, we feel, is the stimulating effect extra payments of this kind have upon the general trend of business.

"We feel that there could be no better time to put extra purchasing power in the hands of the people than just prior to the holidays."

O'Cedar's New Containers

The O'Cedar Corp., Chicago, is now marketing both its liquid and paste waxes in containers using a maroon and yellow color combination.

Gulf's Advertising Program

Gulf Oil's chemical specialties will again be advertised through "Gulf Funny Weekly," of which 2,500,000 copies are distributed by Gulf dealers and service stations. In '36 space in various popular fiction magazines will also be used. (See p67 for photo of the Gulf family group of chemical specialties.)

Jared Holt Plant Damaged

The Jared Holt Co.'s plant at Albany, N. Y., was seriously damaged by fire on Dec. 21. Company making belt wax, shoemakers' wax and shoe polish is 101 years old, and is the oldest and largest plant in the country handling beeswax.

N. A. I. & D. M. Secretary Moves

Office of the secretary of the National Association of Insecticide & Disinfectant Manufacturers is now in Suite 1913A of the Chanin Bldg., 122 E. 42nd st., N. Y. City. A cordial invitation is extended to members to visit and a desk is reserved for the use of out-of-town members.

Thiokol Appoints Maloney

The Thiokol Corp., Yardville, N. J., manufacturer of special synthetic rubber products, appoints T. J. Maloney, Inc., as advertising counsel.

Burns, Dearborn, Dies

Alexander B. Burns, 63, Pacific Coast manager for Dearborn Chemical, died Dec. 14 at Pasadena of a heart ailment.

Lever's Plant Expansion

Lever Bros., world famed oil and soap interest, plans a $5,000,000-$8,000,000 investment for the enlargement of its Hammond, Ind., plant. Beside a new vegetable shortening plant additions are to be made to the refining and soap units.

Automotive Specialty Makers Meet

The Automotive Chemical Specialties Manufacturers Association held its annual meeting on Wednesday, Dec. 11th, during automotive convention week at Atlantic City.

Principal subjects discussed were those relating to the work of the association and the trade code authority under the N.R.A. Quite a representative group of manufacturers attended the meeting and the subsequent luncheon at the Ritz Carlton Hotel.

Officers for the new year were elected as follows: J. H. Cattell, president, of Warner Patterson Co., Chicago, Ill.; J. A. Tumbler, vice-president of J. A. Tumbler Laboratories, Baltimore, Md.; Noah Van Cleef, secretary-treasurer of Van Cleef Bros., Chicago.

370,492
AZO

370,697
REELSLICK

371,078
Fomaide

370,493
AZO
ZZZ

370,751
ARALINE

371,132
AQUATONE

370,839
ROBERT

370,512
DURATONE

370,993
POLARITE

371,133
AQUASTONE

370,520
OXYO-LASTIC

371,183
SUPERFILM

370,521
DURO-LASTIC

370,994
RECOTO

371,202
CASCOTIN

370,569
INDRUROID

371,038
NYANTINE

371,255
WHITE CLOUD

370,492. American Zinc Sales Co., St. Louis, Mo.; filed Oct. 18, '35; for zinc oxide of fine grade; use since Nov. 21, '18.
370,493. American Zinc Sales Co., St. Louis; filed Oct. 18, '35; for fine grade zinc oxide; use since Nov. 21, '18.
370,512. Iteco Laboratories, Portland, Ore.; filed Oct. 18, '35; for phenol-formaldehyde resin base; use since Apr. 1, '35.
370,520. Omaha School Supply Co. (Central Specialty Co.), Omaha, Neb.; filed Oct. 18, '35; for paste; use since May 23, '35.
370,521. Omaha School Supply Co. (Central Specialties Co.), Omaha, Neb.; filed Oct. 18, '35; for paste; use since May 23, '35.
370,569. Ruberoid Co., Bound Brook, N. J., and N. Y. City; filed Oct. 19, '35; for asphalt composition roofing; use since '04.
370,697. Vern Dale (Outers Labs.), Onalaska, Wis.; filed Oct. 23, '35; for anhydrous colloidal graphitic rust preventing and lubricating oil; use since Apr. 1, '35.
370,751. Arabol Mfg. Co., N. Y. City; filed Oct. 24, '35; for liquid rubber compound used to coat shipping containers; use since Sept. 26, '35.
370,839. Robert Enterprises, Inc., N. Y. City; filed Oct. 26, '35; for toilet soaps; use since '23.
370,993. Max H. McClure (Delko Paint Mfg. Co.), St. Louis, Mo.; filed Oct. 30, '35; for enamel paints; use since '22.
370,994. Max H. McClure (Delko Paint Mfg. Co.), St. Louis; filed Oct. 30, '35; for enamel paints; use since '22.
371,038. Nyanza Color & Chemical Co., N. Y. City; filed Oct. 31, '35; for chemicals used in dyeing; use since Oct. 24, '35.
371,078. Pyrene Mfg. Co., Newark, N. J.; filed Nov. 1, '35; for fire extinguishing solution; use since Aug. 9, '35.
371,132. Atlantic Calsomine Co., Brooklyn, N. Y.; filed Nov. 4, '35; for hot water wall finish; use since Feb. 14, '35.
371,133. Atlantic Calsomine Co.; filed Nov. 4, '35; for cement paint; use since May 8, '35.
371,183. Stein, Hall Mfg. Co., Chicago & N. Y. City; filed Nov. 4, '35; for starch products, namely, sizing adhesives; use since June 5, '35.
371,202. Casein Mfg. Co. of America, N. Y. City; filed Nov. 5, '35; for casein paste; use since July 1, '25.
371,255. American Gypsum Co., Port Clinton, Ohio; filed Nov. 6, '35; for cold water paints; use since Oct. 28, '35.

Popularizing "Dreft"

Co-eds are being used in a Dreft sampling campaign in Chicago by P. & G. Crew of 35 fair college alumni, far above the average sampling crew, will sample homes in selected districts, representing 50% of the Chicago total.

The girls make every effort to make a personal presentation of the 15c package of Dreft, in order that they may explain that the product is not a soap, that it contains no alkali, but is a new discovery recommended for laundering fine fabrics.

CHEMICAL

NEWS & MARKETS

William M. Rand succeeds Charles Belknap as Monsanto's president.

NETHERLANDS PACT HITS CHEMICALS

Tariff Rates Cut on Varied List — Chemical Industry Not Represented at Berry N. R. A. Funeral Rites—E. H. Hooker Scores T. V. A. Competition with Business—

The chemical industry will find the new U. S.-Netherlands tariff trade pact of more than academic interest for it contains concessions on a number of important commercial chemicals. The more important changes are summarized as follows:

Commodity	Old rate of duty	New rate of duty
Amyl alcohol	6c per lb.	4c per lb.
Fusel oil	6c per lb.	4c per lb.
Laundry sour	25%	15%
Ammon. silicofluoride..	25%	15%
Haarlem oil	25%	15%
Caffeine	\$1.25 per lb.	90c per lb.
Theobromine	75c per lb.	65c per lb.
Flavoring extracts containing more than 50% of alcohol	80c per lb. plus 25%	60c per lb. plus 18%
Amyl acetate	7c per lb.	4c per lb.
Edible gelatine valued under 40c per lb.	5c per lb. plus 12%	$2\frac{1}{2}$c per lb. plus 12%
Refined glycerine ($\frac{3}{8}$c lb. differential over 1c rate on crude glycerine guaranteed)	2c per lb.	$1\frac{5}{8}$c per lb.
Cajeput oil	25%	$12\frac{1}{2}$%
Lithopone containing less than 30% of zinc sulphide	$1\frac{7}{8}$c per lb.	$1\frac{1}{4}$c per lb.
Potato starch	$2\frac{1}{2}$c per lb.	$1\frac{3}{4}$c per lb.
Dextrine made from potato starch or potato flour	3c per lb.	$2\frac{1}{4}$c per lb.

In the U. S.-Honduras tariff pact reductions are made by the latter on soaps and pharmaceuticals. In return, the U. S. is reducing the rate on several products including a number of crude drugs.

The much-heralded industrial conference called last month by Major Berry, co-ordinator for industrial cooperation, fell with a dull thud, and as was widely reported in the daily newspapers almost ended in physical disorder. Despite optimistic assertions as to the probable results yet to come from a meeting of 15 industrial councillors scheduled for Jan. 9th, industry generally feels that the latest effort to inject Government control into business will die even a quicker "death" than the NRA. The Chemical Alliance was not represented at the meeting.

All chemical, drug and chemical process industries were assigned to a single group and at the 2 sessions held but 15 members were present.

This group agreed that it included so many different industries that it could not pretend to send a delegate to the council to represent the chemical industry as a whole, so it was decided that each industry represented could send a man to the council if it desired. Group adopted 5 resolutions, favoring maintenance by individual firms of wage and hour provisions of NRA codes; favoring broadening the powers of the F. T. C. to deal with voluntary trade practice agreements; opposing licensing of firms to do business in interstate commerce; advocating a census of unemployment to obtain more dependable figures; proposing a study of Federal taxes and the relation of unemployment to taxation.

Government in business was denounced by Elon H. Hooker, president of Hooker Electro-Chemical, in a debate with Dr. Arthur E. Morgan, TVA chairman, on the subject of "Is Government Competition Retarding Business Recovery," on a recent "America's Town Meeting Program."

Mr. Hooker ridiculed Government in business and cited the annual Post Office deficit and the run-down condition of the railroads when turned back to private ownership after the war as examples proving that Government could not efficiently engage in business. A large part of his address attacked heavy taxation and the "blunders of bureaucracy"; which he said is attempting to develop electric power in areas already amply supplied.

"No one fears Government competition in business," Mr. Hooker said, "because business knows that it can always compete with real Government costs and inefficiencies, but what every thinking American, in and out of business, must fear and resent is Government hostility to business. Government was not conceived to compete with the very citizens who support it."

He quoted from charts which he said showed that from '13 to '35, cost of living rose 36% while domestic electricity, under private management, decreased 27%.

"Our country has grown rich and powerful through the toil, industry, thrift, vision and initiative of its private citizens," Mr. Hooker said, "made possible by the freedom they enjoyed under the Constitution.

"Present Administration is notoriously lacking in business vision or effectiveness. One need go no further than its power program."

Countering, Dr. Morgan stated: "The T. V. A. has pointed the way to recovery. If all America had similar low but adequate rates . . . we should be well on the way to recovery, especially if all big business should work on the principle of large use and small margins of profit. There is no overproduction of power, only tremendous underconsumption. Utilities, with watered stock, exploitation and excessive rates block the road to recovery."

SWANN RE-ENTERS: INNIS RE-ORGANIZES

Theodore Swann at Birmingham to Manufacture Chemicals Now Imported—Old Firm Takes Over its Producing Subsidiary—

Theodore Swann, whose meteoric rise in the chemical field provided one of the most interesting "career" stories ever written, is coming back to the industry after a short absence following his sale of his control in the Swann Co. to Monsanto in '33.

THEODORE SWANN
His early re-entry was thought likely.

W. H. SHEFFIELD
Innis, Speiden head reports Isco subsidiary absorbed.

Work has already been started on the construction of the laboratory and office unit for Swann & Co. which is being organized for the manufacture of organic chemicals and other allied products now imported. New company will not produce any of the products produced by the former Swann subsidiary. Plant will be located in Birmingham.

According to Mr. Swann, several new processes are in the development stage. Some of these will require raw materials from the farm and will thus benefit agriculture.

Mr. Swann in the interim has acted as an industrial adviser to Gov. Bibb

Supplementing the Candid Camera "Shots" of outstanding booth displays shown on the Rotogravure Section of this issue, CHEMICAL INDUSTRIES *reproduces on this and the following page several additional photographs of booths to show the reader who was not fortunate enough to have attended the Exposition the new note of "elaborateness" that predominated the displays. "Best in years," was the verdict of the exhibitors.*

Graves of Alabama, devoting considerable time to obtaining a Federal loan and grant for an industrial water supply for Birmingham.

Officers of the new corporation will be Mr. Swann, president; Paul Logue, vice president in charge of operations; F. E. Nabers, Jr., vice president in charge of sales; Dr. R. R. Bottoms, director of research; Mrs. Catherine D. Swann, treasurer; Miss Alma Lide, assistant secretary and treasurer, and Miss Elsa P. Thern, N. Y. City, assistant secretary and treasurer.

Stockholders of both Innis, Speiden and Isco Chemical, at special meetings held Dec. 30th, voted the merger of both companies. Isco was a wholly owned subsidiary of Innis, Speiden, formed in '15 as the manufacturing unit of Innis, Speiden, and produced alkalies and potash compounds, products which formerly had been imported from abroad. The war made such importation difficult.

Innis, Speiden is one of the oldest, if not the oldest factor in American chemical circles, and is 118 years "young." The Isco plant was erected at Niagara Falls and has been remodeled and enlarged on several occasions. Within the past 2 years production of liquid carbonate of potash was undertaken, and is now being shipped in large tonnages.

EXPOSITION CALLED MOST SUCCESSFUL

Exhibitors Report Substantial Business Placed—German Chemists Extend Invitation to Attend Frankfurt Exposition in Sept. '37—

Rise of American chemistry and chemical engineering. interpreted through its Exposition of Chemical Industries during the past 20 years, was brought to a new climax last month with the 15th Exposition, held at Grand Central Palace, N. Y. City. Two hundred and fifty-seven exhibitors gave visual indication that the American chemical industry is depression proof. They portrayed the industry in terms of its basic principles and at the same time recognized the showmanship which the modern tempo demands. Exhibits were built to be interesting, not merely to inform. The dynamic superseded the static. Illumination was adapted to the eye of the visitor, and operating mechanisms were designed to tell the story even without words. All this simplified the problem of the chemist or business executive in hopes of glimpsing the 2 year chemical advance of America in a period of a few hours.

Whether or not a new attendance record was set is of little importance, but the definite feeling on the part of the exhibitors that the show had been a decided success, measuring it solely by the actual business placed, is of great importance, for such opinions were not forthcoming after the '33 Exposition. All exhibitors interviewed by CHEMICAL INDUSTRIES' representatives were enthusiastic about the definite results obtained, and felt that the extra efforts put forth in nearly every case had been well repaid. Fewer "sightseers" were there, but more executives of the chemical and related industries took advantage of the opportunities presented by the show.

For the 2nd successive Exposition CHEMICAL INDUSTRIES showed the new chemicals brought out by its advertisers and the advertisers in the CHEMICAL GUIDE-BOOK. Three hundred and thirteen new products were on display. Many of the chemicals were also shown at the A. C. S. booth where "The Children of Recovery" replaced "The Children of the Depression."

Space does not permit a detailed report on the various chemicals and equipment. Several highlights can be mentioned, however, including the revolutionary micro-centrifuges manufactured by International Equipment of Boston, and exhibited at the Eimer & Amend booth. New conical heads were shown, streamlined for high speed, built on the sloping sedimentation principle, with greater number of tubes, and of light weight and unusually strong. The new "Flexlock" rubber joints for bell and spigot chemical stoneware piping, brought out by Goodrich and featured at the U. S. Stoneware booth, attracted attention. Remote weight control and recording by Toledo Scale came in for a lot of attention too, as did the distillation apparatus which incorporates the revolutionary principles reported by Dr. Walter J. P. Podbielniak at the N. Y. City meeting of the A. C. S. in April of last year.

Chemical and chemical specialty manufacturers exhibited keen interest in the new Packomatic Auger Packer, marketed by the J. L. Ferguson Co. Relatively cheap, but remarkably accurate, it is easily adaptable to the handling of all non-free flowing powdered products that require force feeding and packing.

A newcomer to the show was the Chemical Foundation and the Farm Chemurgic Council and the various exhibits designed to show the part that agriculture can play in future industrial development in this country.

Atlas Powder's new products, Mannitol and Sorbitol, were shown, but as they are described in detail in the Chemical Specialties Section of this issue no detailed explanation is necessary.

Attention was drawn to a new method for making pigmented and unpigmented

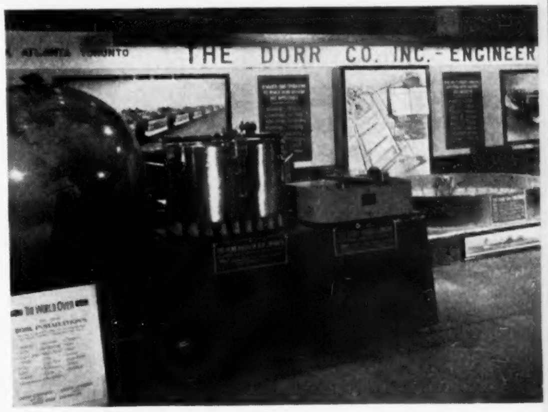
nitrocellulose lacquers emulsified in water. This development is said to make possible the application of films of high solids content which otherwise would be unsprayable. Costs are lowered because of the reduced quantity of solvents required. The use of nitrocellulose lacquer as a coating for paper and cardboard packages was emphasized by one manufacturer.

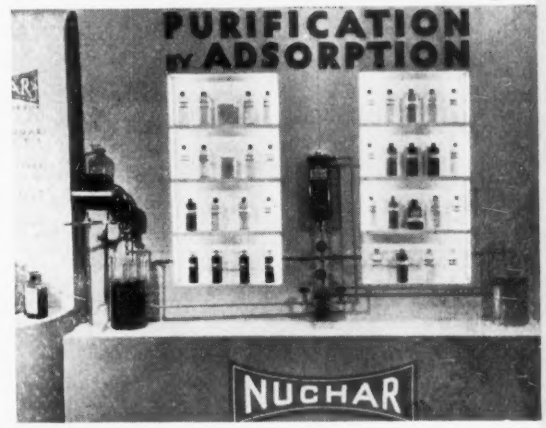
German chemists and chemical engineers will be host to American chemical industrialists at a giant exposition, similar to the recent Chemical Show in N. Y. City, to be held at Frankfurt in Sept., '37. This was the promise of Dr. Ernest Bretschneider, leader of 32 prominent German chemists and chemical engineers visiting this country early last month.

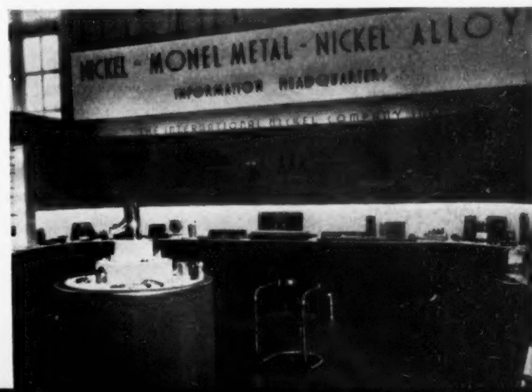
In an exclusive C. I. interview, Dr. Bretschneider summed up their trip as a decided success. Excellent reception tendered his party had facilitated exchange of viewpoints, friendships, and mutual advantages of new connections. "Our purposes have been entirely fulfilled, and the impressions we take back with us are much different than those we have derived at home, through books we have read," said Dr. Bretschneider.

Impressive to the visitors was the speed of our engineering and unit operations. Somewhat at variance with Prof. Adams, A.C.S. president, is Dr. Bretschneider's criticism of our chemical research. Columbia, Harvard, and M. I. T., among the universities, and research institutions like Mellon and Carnegie outrank German research facilities at nearly every turn, Dr. Bretschneider believes. Questioned on his opinion of Prof. Adams' recent comparison of American and German research problems, Dr. Bretschneider said comparison should be made of equipment and organization, rather than actual man power. Present trend in Germany, he said, is toward the theory of "a sound mind in a sound body," which reduces the actual amount of time spent by German students on research problems. However, Dr. Bretschneider reiterated strongly his opinion that in research equipment and organization, our country is relatively better equipped than his own.

Visit to the Chemical Exposition concluded a tour which led the visitors to leading industrial and educational centers in N. Y., N. J., New England, Delaware, and as far west as Pittsburgh. Contacts established during the trip will aid greatly in planning for the '37 exposition at Frankfurt.







NOVEMBER EXPORTS TOP OCTOBER HIGH

Sulfur and Naval Stores Only Major Classifications to Show Declines —International Trade in Naval Stores and Other Paint Products More Active—International de Chimie Reports 1st Year Activities—

U. S. November exports of chemicals and allied products surpassed even the high record of the preceding month when shipments reached the value of $13,570,000, a preliminary survey indicates. This was contrary to the usual trend as normally there is a tendency for exports of such products to decline during the closing months of the year.

All major classifications except crude sulfur and naval stores shared in the gain. Industrial chemicals led the list in November with shipments valued at $2,347,000, compared with $2,207,000 during the preceding month, and $2,000,000 for November last year. This group was followed by fertilizers amounting to 153,000 tons valued at $1,895,000 against 118,400 tons valued at $1,162,000 for the corresponding month of last year.

Most spectacular gain was recorded by paints, pigments and varnishes. Total shipments of these products were valued at $1,709,000 in November, an increase of $468,000 over the preceding month, and $431,000 greater than in November, '34.

Other gains made during the month, compared with November '34, included chemical specialties, which increased from $961,000 to $1,131,000; medicinals from $1,029,700 to $1,204,000; and coal-tar products from $1,076,000 to $1,321,000.

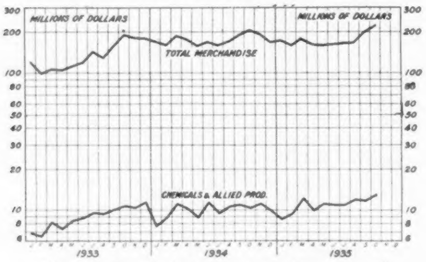
Shipments of naval stores, gums and resins valued at $1,052,000 in November and crude sulfur at $703,000 were about the same as in the same month of '34. Chemical imports, particularly coal-tar products and fertilizer materials, were also high in November.

International trade in naval stores and other paint products has been more active in recent months and particularly during October. Portugal reports an increased demand for turpentine and rosin in October and attributes trend to industrial activity in several European countries, especially Germany. In order to meet the increased demand for these products, Portuguese distilling plants continue to operate at full time.

French naval stores trade was characterized by continued firmness of the market tone in October with a steady increase in quotations, according to a report from Bordeaux, though the improvement was due in large measure to the continuation of export bounties on both turpentine and rosin. Market was also strengthened by trade reports that the French Government may organize a cartel of the industry.

Exports of turpentine from Spain aggregated 1,526,100 gals. during the 1st 8 months of the current year compared

with 1,334,365 for the corresponding period of last year. Rosin exports, however, declined from 13,776 to 11,148 metric tons.



U. S. exports of general merchandise and chemicals and allied products.

Production of naval stores in the Durango area of Mexico returned to normal in October, following 2 months of adverse weather conditions. Producers have been directed by the Mexican Forestry Dept. to change by the end of the year from the American method of turpentining to the French system, though producers have hopes of having the order changed. Favorable weather conditions in the Guadalejara district also resulted in increased production in October, according to estimates.

Foreign demand for American naval stores was especially active in October. Turpentine shipments totalled 1,545,750 gals. compared with 480,675 during October last year and rosin exports increased from 77,360 to 109,200 lbs., preliminary statistics show. Heavy shipments of both turpentine and rosin were made to the United Kingdom during the month.

For the past year the efforts of the Office International de Chimie at Paris have been directed toward centralization of chemical information with a view to facilitating research in this branch of science. At a recent meeting of the permanent committee of the Office, work accomplished during the past 12 months was reviewed and plans for an extensive future campaign were discussed.

Outstanding among the accomplishments of recent months was the publication of an international index of centers of chemical information, listing the various organizations from which scientific, technical, and economic data on chemical questions may be obtained. Supplementing this publication, an index of chemical publications is under preparation. The use of motion pictures as a means of documentation was discussed in detail, and it is expected that developments in this field will prove invaluable to scientists.

An American tribute of respect has just been paid to one of the greatest pioneers in the story of chemistry and pharmacy, the Swedish scientist Dr. Karl Wilhelm Scheele. Although celebrated especially as the discoverer of glycerine, Dr. Scheele has to his credit the isolation and analysis of a long list of other substances unknown before his time. On Dec. 19, the 193rd anniversary of Scheele's birth, the American-Scandinavian Foundation cabled to Crown Prince Gustaf Adolf of Sweden expressing appreciation for his nation's service, through Dr. Scheele, to human progress.

What is considered to be the world's largest activated carbon manufacturing plant is in operation at Nyni-Nowgorod, U. S. S. R. It was designed and built by the French Acticarbone Co.'s engineers and is operated by the Russian chemical trust under license from Acticarbone.

This plant, in operation since '32, manufactures 10,000 metric tons of vapor adsorbent and decolorizing carbons per year—22,046,000 lbs.—or nearly twice as much as the combined production of all American plants during '34, according to reliable estimates.

French chemical industry has made considerable progress in recent years, particularly with regards to net profits. A composite report of 7 leading French chemical companies capitalized at 1,277,000,000 francs shows a net profit of 141,000,000 for the low year of '32. It is interesting to note also that the capitalization of these plants stood at 738,000,000 francs 10 years ago.

Possible commercial deposits of phosphate rock are reported in Spain, in Murcia Province.

The international citric acid agreement concluded last year between Italy and the synthetic producers is valid for 5 years, according to the British *Chemical Age*. The Italian industry received a sales quota of 38%.

Citric acid is not now being produced in Spain in any appreciable amounts.

Tunisian phosphate exports during the 1st 9 months of '35 totaled 1,035,500 metric tons, a decline of 329,000 tons from the corresponding period of '34. Production, which during the period under review declined 193,500 tons to 1,157,500 tons, exceeded exports in '35 (9 months) by 122,000 tons.

Staveley Coal & Iron, England, is building a sodium chlorate plant. This product is not made in England and projected production will more than equal present consumption.

Statistics of Greenland Cryolite Exports, *Chemische Industrie*, Nov. 29, reveal that nearly one-half of the '34 output of 15,000 tons was consigned to the Copenhagen concern, Oresunds Chemiske Fabriker, while a considerable proportion went to Penn. Salt.

I. C. I. is now erecting a 500 ton pilot cyanide plant in South Africa through its subsidiary, African Explosives. A large-scale plant is to be erected later.

Many settlers of East Africa, particularly those that have found it difficult to make a profit from such products as sisal and coffee, are turning to the production of essential oils, according to a report from Consul R. B. Streeper, Nairobi, made public by the Dept. of Commerce.

W. K. LEWIS, M. I. T., RECEIVES PERKIN MEDAL

Weidlein Elected to Head A. C. S. in '37—Bass is New N. Y. Section Chairman — Jacobs Elected President, Chlorine Institute — Eble Attacks Recent Trade Pact with Canada—

Perkin Medal for '36 was presented Jan. 10th to Prof. Warren K. Lewis,

PROF. WARREN K. LEWIS

M. I. T. professor of chemical engineering, at a meeting of the American Section of the Society of Chemical Industry, held at The Chemists' Club, N. Y. City. Meeting was held jointly with the A. C. S. Dr. George A. Burrell of Burrell-Mase Engineering Co. gave a short talk on the subject of the medalist and Prof. Marston T. Bogert, Columbia, made the presentation. Professor Lewis gave the Medal address entitled "Application of Physical Data to High Pressure Processes."

Professor Lewis spoke about the use of high pressure in modern chemical industry, as in the syntheses of ammonia, the aliphatic alcohols and phenol, the hydrogenation of coal and oil and the separation of mixtures by both absorption and rectification.

Warren K. Lewis was born in 1882, in Sussex County, Delaware, studied in the public schools of Laurel, Delaware and Newton, Mass., and graduated in chemical engineering from M. I. T. in '05. He served one year in that Institute as laboratory assistant in industrial chemis-

try, after which he studied for 2 years in Germany, taking his Doctor's Degree in chemistry under Abegg and Ladenburg at the University of Breslau. In '09 he became chemist for the tannery and leather-board mill of the W. H. McElwain Co. at Merrimack, N. H. A year and a half later he returned to M. I. T. as assistant professor of industrial chemistry and has been on its faculty continuously since that time. During the war, 1st in the Bureau of Mines and later in the Chemical Warfare Service, he had charge of research on gas defense. He correlated and directed the work of the various laboratories and cooperated in the reduction to practice of the results achieved in the manufacture of protective devices by the Gas Defense Production Division.

Dr. Edward R. Weidlein, director of Mellon, is elected A. C. S. president for '37. Dr. Weidlein was nominated in a national poll of the 19,000 members. Final choice was made by the Society's Council from the 4 nominees receiving the largest number of votes. Dr. Weidlein will serve as president-elect during '36.

On Jan. 1, Prof. Edward Bartow, head of the department of chemistry and chemical engineering in the State University of Iowa, took office as president of the Society, succeeding Prof. Roger Adams, University of Illinois.

Dr. Lawrence W. Bass, director of research of The Borden Co., is the new chairman of the N. Y. Section of the A. C. S. Other officers of the Section

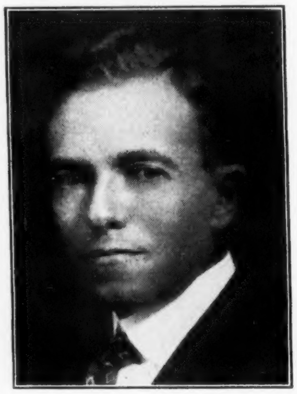
DR. LAWRENCE W. BASS
He directs Borden research activities.

have been chosen as follows: Dr. D. P. Morgan, chemical economist of Scudder, Stevens & Clark, vice chairman; Miss Lois Woodford, Freeport Sulphur, secretary; C. H. DeLong, Amusol Co., treasurer.

Dr. Bass, who served as vice-chairman of the Section during '35, will also head the board of directors, members of which, in addition to the officers, will be Prof. Arthur L. Hixson of Columbia, retiring chairman; Duncan A. MacInnes of the Rockefeller Institute, and Prof. A. B. Newman of Cooper Union.

August Merz, Calco Chemical, was reelected president of the Synthetic Organic Chemical Manufacturers Association at the annual meeting of the group held in the Chemists' Club on Dec. 12. E. H. Killheffer, du Pont, and Dr. F. G. Zinsser, Zinsser & Co. were named vice presidents, and Dr. Ralph L. Dorland, Dow Company, was chosen treasurer. Charles A. Mace will continue as secretary. William B. Bell, president of Cyanamid, and M. R. Poucher, active in the dye industry, spoke on the general problems of the industry at the luncheon. Francis P. Garvan was also scheduled to speak but was unable to do so at the last minute.

S. W. Jacobs, Electro Bleaching Gas, is the new head of the Chlorine Institute; Eben C. Speiden, Innis, Speiden, is vice-



S. W. JACOBS
He knows chlorine from all angles.

president. Robert T. Baldwin, consultant, is again secretary. Following were elected directors for 2 year terms: J. F. C. Hagens, Great Western Electro-Chemical; H. M. Hooker, Hooker Electrochemical; S. W. Jacobs; and Eben C. Speiden. Elon H. Hooker, Hooker Electrochemical president, was the principal speaker at the annual meeting.

Eleventh Annual Banquet of the Drug, Chemical and Allied Trades will be held on Thursday evening, Mar. 19th, at the Waldorf-Astoria, N. Y. City, with a reception beginning at 6:30 P. M. Committees are being set up and plans are underway to make this the most outstanding and successful get-together the trade has ever known. Last year 1,500 executives attended the annual affair and close to 2,000 are expected at the 11th gathering of the section.

Committee on Unemployment and Relief for Chemists and Chemical Engineers in the Metropolitan area of N. Y. in its annual report states that since its inception 2,142 qualified chemists and engineers have registered. To date 574 have been re-absorbed in the chemical industry on permanent jobs. Committee's active file now has 485 names with 331 of these totally unemployed. To date 257 registrants and their families have received financial help from the fund. Plans are being discussed to place the Committee on a permanent basis and to enlarge somewhat its sphere of activity.

Referring to the Canadian treaty as a "sell out," Capt. F. X. A. Eble, managing director of the American Match Institute and organizer of the "Buy American Movement," told members of the drug, chemical and allied trades section of the N. Y. Board of Trade at its 45th annual meeting at the Pennsylvania that 3 years before the treaty was being negotiated and while it was being consummated Canada was carrying on an intensive "Buy Canadian Products" campaign.

He also pointed out that the movement in Canada was supported wholeheartedly by the Canadian Manufacturers' Association and that Canada was a "full 40 jumps" ahead of this nation in a "Buy American Movement." A high spot in his talk was his reference to this country's trade balance during the 1st 10 months of this year, compared with '34.

For the record Chemical Industries reports that the annual dinner of the Salesmen's Association of the American Chemical Industry was held at the Park Central in N. Y. City on Dec. 26th, with 240 in attendance. The dinner turned out to be a farewell party to President Alvarez who goes from the N. Y. City offices of Grasselli to take charge of the New Haven office of the company. The 10th edition of the *Chemical Peddler* was distributed by newsboys. In celebration a special issue was prepared by Editor Ira "MacSnort."

Philadelphia Chemical Club has again smashed a precedent. For the 1st time in its long history a golf tournament was held last summer, and on Dec. 20 the 1st annual Christmas Party was instituted. A big crowd thoroughly enjoyed the evening of entertainment.

G. E.'s new recording photoelectric spectrophotometer, which makes it easy to obtain, quickly and accurately, an analysis of the color of a wide variety of materials, was demonstrated at the convention of the American Association for the Advancement of Science, held in St. Louis at the close of the year.

A survey of wage and hour conditions in the chemical manufacturing industry is being made by the Chemical Alliance.

Apex Color, 50 W. Bway., N. Y. City, agrees in a stipulation to stop using "white lead" when the pigment content is not composed of white lead.

Rinaldo had geranium trouble

ALTHOUGH Rinaldo's job is plumbing—his hobby is geraniums. He grows some pretty swell ones in his spare time.

Not long ago the geraniums were attacked by bugs, and Rinaldo was downhearted until he found the right insecticide. He was pleased because it worked so quickly—but he didn't know that Du Pont chemists had labored long and patiently to produce that formula.

It's a far cry from Rinaldo's little garden to a thousand-acre wheat farm in South Dakota, an orchard in Florida, or a truck farm on Long Island—but chemistry is providing similar protection for growing things in every corner of the country.

Even before insecticides are needed—soil must be rich enough to feed the plants. Here, too, the chemist does his part. Out of air, water and coal he creates nitrogen compounds to replace the nitrogen that nature cannot restore to the soil fast enough for modern agriculture.

In these and other ways, Du Pont chemical research and discovery make life happier and more secure for nearly every person in the land.

BETTER THINGS
for BETTER LIVING
. . . THROUGH CHEMISTRY

Producers of Chemical Products since 1802

E. I. DU PONT DE NEMOURS & COMPANY, INC.

ORGANIC CHEMICALS DEPARTMENT . . . . WILMINGTON, DELAWARE

RAND SUCCEEDS BELKNAP AT MERRIMAC

Belknap Goes to St. Louis as Monsanto Executive V.-P.—Ill Health Forces Rood, Hercules, to Resign — Hitchcock Joins Hooker — McMullen Now Directs Eagle-Picher Research—

HERCULES' ROOD HOOKER'S HITCHCOCK EAGLE-PICHER'S MCMULLEN

Leading names in the personnel changes of the month.

William M. Rand is now president of Monsanto Chemical's subsidiary, Merrimac Chemical. He succeeds Charles Belknap, who recently moved to St. Louis, headquarters of Monsanto Chemical, as executive vice-president. Mr. Rand joined Merrimac in '19 and has been vice-president in charge of sales since '23. Mr. Rand is also a director of Monsanto Chemical. He has been very active in association work in the industry.

Resignation of N. P. Rood as vice president, director, and member of the executive committee of Hercules Powder because of ill health was announced last month by R. H. Dunham, Hercules president. Necessity of lightening his business activities comes at the end of thirty-seven years of service in the explosives industry.

Dr. Lauren B. Hitchcock resigns as professor in charge of the course in chemical engineering at the University of Virginia to join Hooker Electrochemical as consulting chemical engineer with particular reference to caustic soda sales with headquarters at 60 E. 42 st.

V. N. Morris, associated with the Firestone research division for the past 8 years, is now engaged in a research capacity for Resinous Products & Chemical of Philadelphia.

Earle W. McMullen is now director of research of Eagle-Picher Lead, a position formerly held by Dr. John A. Schaeffer, who resigned to become President of Franklin and Marshall. Since '09, when Mr. McMullen graduated from Armour, he has been active in various phases of theoretical and practical research, both in the organic and inorganic fields. His early work as instructor in metallurgy at Armour, his 15 years experience as director of research and technical processes at the Simmons Co., plus his later work on insulating products with Celotex, especially qualify him to fill his new duties most capably.

E. C. Roberts is the new V.-P. in charge of sales for Detroit Graphite. He is well known and recognized throughout the industry for his intimate knowledge of the industrial markets in which field Detroit Graphite deals exclusively.

George P. Huisking, for many years associated with Chas. L. Huisking & Co. Inc. will establish a Chicago branch for that Company and for Conti Products Corp., closely associated with it.

Harold B. Croasdale, formerly a consulting chemist with offices in the Chemists' Club Bldg., N. Y. City, is opening an office at Delaware Water Gap.

H. J. Osborn has been elected 1st vice-president of International Salt. Mr. Osborn will remain at the N. Y. City offices and retain his office of secretary. Harry M. Griffiths of Scranton, Pa., has been elected 2nd vice-president.

C. C. Crane, formerly Keystone Steel & Wire chief chemist, is now a metallurgist for Republic Steel.

Clarence W. Clark, superintendent of du Pont's Everett plant, has now been called to Wilmington for more important duties. P. J. Griffin, formerly in charge of the paint plant at Chicago, is now at Everett.

J. C. Ackerman, Pittsburgh distributor for several well known chemical companies, with offices at 1230 Gulf Bldg., is in a new and larger office at 815 Gulf Bldg., where he will also have increased telephone service. F. A. Haptonstall, Jr., vice-president and treasurer of Best Chemicals, Inc., Pittsburgh, has severed his connection with that company and is now associated with J. C. Ackerman.

Cooperative G. L. F. Mills opens temporary offices at 21 West st., N. Y. City. Joseph L. Batty is in charge of purchasing other than fertilizer materials and Albert Spillman is fertilizer production manager.

American Aniline Products opens branch office, laboratory and warehouse at 55 Pine st., Providence, R. I.

Ohio Chemical & Mfg., Cleveland, leases one-story building at 55 S. Manassas st. for wholesale storage purposes.

ADAMS AWARDED WILLARD GIBBS MEDAL

Irenee duPont Criticizes Attempts to Sovietize U. S. — Pfaltz & Bauer Bring Loewenstein, Apparatus Expert, to this Country—Magnus Again Heads Board of Trade—Douglas Attends Gridiron Dinner—

Prof. Roger Adams, head of the department of chemistry at Illinois, has been awarded the Willard Gibbs Medal of the Chicago A. C. S. Section for '36, one of the highest scientific honors bestowed. Prof. Adams, retired as A. C. S. president on Jan. 1, will receive the Medal for outstanding and fundamental contributions to synthetic organic chemistry, and for conspicuous achievements as a teacher of chemistry.

The Willard Gibbs Medal, founded by William A. Converse in '11, was named for Josiah Willard Gibbs, professor of mathematical physics at Yale from 1871 to 1903, and placed by Henry Adams "on the same plane with the 3 or 4 greatest minds of his country." Although not primarily a chemist, Gibbs's papers are considered among the most important contributions which have been made to chemistry.

Irenee du Pont declared in an "end-of-the-year" statement:

"I can truthfully state that it is my honest belief that if the administration will get out of 'business,' stop penalizing efficient business and get back to the Constitution which, incidentally, will reduce government expenses by a very large proportion, this country will go into the greatest period of prosperity recorded in the entire history of mankind.

"But, if they keep on trying to Sovietize the U. S., and are successful in so doing, it will end either in civil war or the U. S. being reduced to the scale of living of Russia."

Dr. Erich Loewenstein, prominent German chemist, is now in this country and connected with Pfaltz & Bauer as a consultant on scientific methods and apparatus.

DR. ERICH LOEWENSTEIN
His intimate knowledge of scientific apparatus now available in America.

Dr. Loewenstein is known to many in this country who have visited Goettingen where he acted for 25 years as manager of the group of scientific apparatus manufacturers located there. Pfaltz & Bauer represent most of the producers in this group, and Dr. Loewenstein's intimate knowledge of the various pieces of apparatus, etc., will be available to P & B's customers and those interested in the line.

The N. Y. Chapter of the A. I. C. heard J. W. H. Randall on "Some Aspects of the Laminated Glass Industry" at a meeting at the Chemists' Club on Dec. 13.

Dr. Irving Langmuir was elected vice-president and head of the chemistry section of the American Association for the Advancement of Science at the St. Louis meeting on Jan. 2nd.

Percy C. Magnus, head of Magnus, Mabee & Reynard, again will lead the N. Y. Board of Trade. George Simon, Heyden Chemical, is now a vice-president of the Board.

C. E. Michaux, du Pont's Paris representative, sailed recently in the "Ile" (ship reporters' nick-name for the *Ile de France*) after a visit to Wilmington.

Charles H. Proctor, retired electroplating expert of R. & H. Chemicals Division of du Pont, will spend the winter in Florida for his health.

Lewis W. Douglas, former budget director and now a Cyanamid V.-P., was a guest at the Washington Gridiron Dinner.

Gilbert Spruance, Philadelphia paint manufacturer, is a member of the Philadelphia Board of Education.

Fred A. Ullmer, Monsanto treasurer and comptroller, is 1st president of newly formed St. Louis chapter, Comptrollers' Institute of America.

New members of the N. Y. City Chemists Club are: Thomas S. Foley, Swann Products Div., Monsanto; Ejnar Posselt, International Cement V.-P.; Julius A. Kuck, C. C. N. Y. chemistry instructor; Charles N. Frey, Fleischmann Laboratory; and James C. Cassidy, Niagara Alkali.

Robert P. Bonnie of Kentucky Color & Chemical is re-named director of Associated Industries of Kentucky, organization embracing many large state manufacturers and shippers.

Dr. Charles H. Herty, Jr., research metallurgist for Bethlehem Steel, has received the 1st award of the Francis J. Clamer medal, presented by the Technical Society of Philadelphia, for meritorious achievement in the field of metallurgy.

Howard W. Blakeslee, science editor of the Associated Press, talked on publicity before 100 chemists of the Delaware section of the A. C. S. last month. He was introduced by du Pont's head publicity man, Charles K. Weston.

F. A. Wardenburg, general manager, du Pont's ammonia dept., Wilmington, was the principal speaker at the December meeting of the Franklin Institute, Philadelphia—his subject: "High Pressures."

Mr. and Mrs. Pierre du Pont, following a custom of many years, entertained the old folks of Wilmington on Dec. 30th at their estate, "Longwood."

L. S. Kohnstamm, H. Kohnstamm & Co., N. Y. City, will head the chemical and paint division of the United Hospital Campaign Committee.

Prof. Harold C. Urey, winner of the '34 Nobel Prize in Chemistry for his discovery of "heavy water," is in possession of the 1st "Columbia Lion" award of the Affiliated Columbia University Alumni Clubs of New Jersey, presented at a reunion dinner held at the Newark Athletic Club last month.

H. J. Hemingway, R. B. H. Lacquer Base president, returned east recently in the *S. S. California* for the holidays. He was on inspection tour of Pacific Coast trade centers.

Mrs. Irene Curie Joliot and Frederick Joliot, her husband, joint winners of the '35 Nobel Chemistry Prize, received their awards from King Gustaf on Dec. 10 at Stockholm.

David Tumpeer, Wishnick-Tumpeer, is in Florida recuperating from a bad cold.

Miss Alice F. du Pont, daughter of Mr. and Mrs. A. Felix du Pont to James Paul Mills on Nov. 29.

Charles A. Buerk, president, Buffalo Electrochemical, is named executor in the will of the late Wilhelm Hugo Francke of Switzerland, who was a vice-president in the American company.

LAFAYETTE MENDEL DIES AT 63

He was a Pioneer in Physiological Chemistry—Daly, Brilliant Young American Maize Chemist, Succumbs After Brief Illness — Other Deaths in the Industry—

Dr. Lafayette Benedict Mendel, 63, Yale professor and world authority on nutrition, in New Haven, on the 9th. Recipient of many awards and author of several texts

DR. LAFAYETTE B. MENDEL

on the chemistry of nutrition, Dr. Mendel is probably most noted for his work with the vitamins, particularly Vitamin A. Beloved as friend and philosopher, Dr. Mendel has achieved lasting fame for his pioneering in physiological chemistry.

Raymond E. Daly, Jr., 32, suddenly, following a brief illness, at Hammond, Ind., Dec. 3rd. He attended the grade schools of Chicago. He received his training in chemical engineering at the Universities of Illinois and Chicago. In '30 he started his career with American Maize-Products. His rise was rapid and in '32 he was made assistant director of research. He worked in many of the plant departments and was responsible for many improvements, particularly in the processing of lactic acid; manufacture of cereal sugar; and in protein food production. In '35 he was made assistant to the general manager, in charge of operations.

William MacGregor, general sales manager for Carborundum, in N. Y. City, on the 19th. Mr. MacGregor had been with the Carborundum sales staff since coming to this country from Scotland, in '12. He was appointed general sales manager in '26.

George William Fortmeyer, 97, president emeritus, N. Y. Linseed Association, and a former National Lead director, at Stony Point, N. Y., 2nd. Mr. Fortmeyer had spent 60 years with National Lead previous to his retirement, several years ago.

James J. Sullivan, 56, National Cellulose president, of heart attack, N. Y. City, 20th.

Carl W. Blenkhorn, 42, Dow Chemical chemist, of heart attack, 13th.

Sydney M. Nelson, 43, du Pont manager of explosives in N. Y. City, 19th. He went with du Pont in '15.

W. Marvin Robbins, 46, Planters Fertilizer & Phosphate superintendent, in Anderson, S. C., 12th.

William Randolph Barksdale, 57, president of Barksdale Chemical, in Memphis, 14th.

John W. Laffey, 64, head of Barnes Chemical, Paterson, on Jan. 1.

"Chemical research on the products of southern farm land is the crying need of this territory. In such research lies the only hope of a lasting prosperity for your people."

That, in brief, was the message brought to the Mid-South by Dr. William J. Hale, official of the Chemical Foundation, consultant for Dow Chemical and author of many publications in the field of agricultural chemistry. Dr. Hale, who also is a member of the Farm Chemurgic Council, spoke Dec. 11 before the Plant-to-Prosper meeting held in Memphis.

NICKEL TO SPEND $6,000,000 BUILDING

End of the Year Brings Large Number of Expansion Projects to Light—Glidden to Spend $300,000 at Houston—du Pont Plans Addition to Wilmington Headquarters—

Stand-out construction news of last month concerns International Nickel of Canada's announcement of proposed expansion in reserve capacity, estimated at $6,000,000. Contemplated program embraces addition to Copper Cliff smelter, including 2 reverberatory furnaces and 8 converters. Rapidly increasing world consumption of nickel is cited by President R. C. Stanley as being back of this move.

Two companies are rushing construction work at Kearny, N. J. The Co-operative Grange League Federation engages in the manufacture of chemical farm supplies, with fertilizer the principal product. The federation has purchased the site of former Valentine Varnish plant in Jacobus ave., north of Lincoln Terminal. Under construction at present is a $38,000 building, which Kearny officials say company executives have told them is only the first unit of a proposed $4,000,000 plan.

Other concern currently engaged in building operations in the section is Whitaker, Clarke & Daniels. That firm purchased property formerly occupied by the former Riverside Steel Castings Co. plant and is having a $5,000 garage and $13,000 new building erected in addition to $10,000 repairs to an old structure.

Proposed construction of a $300,000 plant at Houston by Glidden is announced by President Joyce. While in Houston Mr. Joyce stated that Texas and the South should turn to raising soybean. He indicated that subsidiary, Durkee Famous Foods, spending over $500,000 annually for cottonseed oil, would buy more soybean oil if available.

Oldbury Electro-Chemical, Niagara Falls, N. Y., awards contracts for one-story steel factory. Estimated cost, including equipment, is $40,000.

Merck plans $23,000 expenditure in enlargement of its Rahway plant. New construction will include 2 new buildings and several undesignated smaller jobs.

Univ. of Delaware receives $300,000 gift for construction of Chemistry Building. Scientific "angel" has remained anonymous.

Ditzler Color, Detroit, will spend $65,000 on new one-story addition.

Eagle-Picher Lead plans 2-story addition to Cincinnati plant for storage and distribution purposes, cost to be about $100,000 with equipment.

Spencer Kellogg Sales is erecting a flaxseed crushing mill at Long Beach, Cal. New mill includes 24 presses, capable of producing other oil than flaxseed if necessary.

U. S. Stoneware plans plant extension which will double floor space at Tallmadge, Ohio, works. Construction includes machine shop, storage dept., and power plant.

Glidden may rebuild its soy bean processing plant at Champaign-Urbana, Ill., according to the local Chamber of Commerce.

Wallace Guano Co., now being organized to produce fertilizer materials, plans construction and equipment of plant at cost of nearly $12,500.

V.-C. is in the midst of a program of improvements at its Savannah plant and river front terminals on Lathrop ave. that will call for an outlay of approximately $35,000.

Du Pont engineers have approved plans for a 13-story addition to its home office building in Wilmington.

American Enka will increase its rayon producing unit at Spartanburg, S. C., with $500,000 expenditure for machinery in '36.

COMING EVENTS

National Association of Dyers & Cleaners, Annual Convention, Washington, D. C., Jan. 14-16.
N. Y. State Sewage Works Association, 8th Annual Meeting, Hotel Astor, N. Y. City, Jan. 15.
American Association Textile Chemists and Colorists, Philadelphia Section, Broadwood Hotel, Philadelphia, Jan. 17.
National Crushed Stone Ass'n, National Sand and Gravel Ass'n, and National Slag Ass'n, meeting concurrently, Hotel Jefferson, St. Louis, Mo., week of Jan. 27.
Fourth International Heating and Ventilating Exposition, International Amphitheatre, Chicago, Jan. 29-31.
Philadelphia Drug Exchange, 75th Annual Dinner, Philadelphia, Pa., Jan. 30.
Technical Association of Pulp & Paper Industry, Annual Meeting, Waldorf-Astoria Hotel, N. Y. City, Feb. 17-20.
Sixth Packaging Exposition, Hotel Pennsylvania, N. Y. City, Mar. 3-6.
American Society for Testing Materials, Regional Meeting, Wm. Penn Hotel, Pittsburgh, Mar. 4.
American Association of Petroleum Geologists, 21st Annual Meeting, Tulsa, Okla., Mar. 19-21.
American Water Works Association, Kentucky-Tennessee Section, Lexington, Ky., Mar. 23-25.
American Ceramic Society, 1936 Annual Meeting, Columbus, Ohio, Mar. 29-Apr. 4.
American Water Works Association, Canadian Section, Annual Convention, Royal Connaught Hotel, Hamilton, Ont., Apr. 1-3.
American Water Works Association, Indiana Section, Purdue Univ., Lafayette, Ind., Apr. 7-9.
American Chemical Society, 91st Meeting, Kansas City, Mo., Apr. 13-17.
National Petroleum Association, Semi-Annual Meeting, **Cleveland Hotel, Cleveland, Apr.** 16-18.
Electrochemical Society, Spring Meeting, Cleveland, Ohio, Apr. 23-25.
Natural Gasoline Association of America, Mayo Hotel, Tulsa, Okla., May 13-15.
International Petroleum Exposition and Congress, Tulsa, Okla., May 16-23.
American Association Cereal Chemists, Annual Meeting, Adolphus Hotel, Dallas, Tex., June 1-5.
American Water Works Association, Annual Convention, Biltmore Hotel, Los Angeles, Cal., June 8-12.
Chemical Engineering Congress, Central Hall, Westminster, England, June 23-27.
American Society for Testing Materials, Annual Meeting, Atlantic City, N. J., June 29-July 3.
American Chemical Society, Semi-Annual Meeting, Pittsburgh, Sept. 7-12.
American Association Textile Chemists and Colorists, Annual Meeting, Providence, R. I., Dec. 4, 5.
"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

LOCAL*

Jan. 31. N. Y. Section, American Association Textile Chemists & Colorists, Elm Golf Club, Paterson, N. J.
Feb. 7. N. Y. Section, A. C. S., Regular Meeting.
Mar. 6. N. Y. Section, A. C. S. William H. Nichols Medal. Joint meeting with Society of Chemical Industry.
Mar. 19. Drug & Chemical Section, N. Y. Board of Trade, Annual Dinner, Waldorf-Astoria.

* Meetings held at Chemists Club unless otherwise noted.

'35 HEAVY CHEMICAL TONNAGES AT PEAK

Higher Bichromate Costs Force Chromic ½c Higher—Manganese Dioxide Schedules Rearranged—Government Frowns on Philippine-Italian Chrome Ore Deal—New Borax Find Reported—

December consumption, while under October and November levels, was highly satisfactory to industrial chemical producers. Tonnages for '35 in most lines were the heaviest since '30. Manufacturers have further cause to rejoice in the successful contract season just closed, and look with optimism towards further volume increases in '36.

Prices remained stable in December. Producers of chromic, however, were forced to put a ½c increase into effect, the direct result of high bichromate costs. Tin salts were lowered when the metal price slumped. The Tin Control Committee has raised the allowable to 90% and some further reduction is thought likely. Copperas is up a dollar a ton. Trisodium phosphate remains unsettled with competition still very keen.

Manganese dioxide prices are revised with the large tonnage quotations lower and smaller lots higher. Schedule is: Car lots, paper bags, $47.50 per ton; burlap bags, $49.50; casks, $51.50; 5 tons to a car lot, paper bags, $50.50; burlap bags, $52.50; casks, $54.50; one cask up to 5 tons, paper bags, $55.50; burlap bags, $57.50; casks, $59.50.

Without exception, the chemical consuming industries registered gains in '35. For example, paper production increased 15%, bringing the industry up to about 75% of capacity. Steel, rubber, leather, paints, varnish and lacquer, textiles, and glass production made decided gains in the past 12 months.

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Acid chromic	$0.14¾	$0.14¼
Copperas	13.00	12.00
DECLINED		
Sodium stannate	$0.32½	$0.34
Tin crystals	.36½	.37
Tin tetrachloride	.25	.26¾

DEPT. OF LABOR STATISTICS	Nov.'35	Oct.'35	Nov.'34
Employment *a*	109.5	108.9	104.4
Payrolls *a*	101.9	100.1	90.7

DATA FOR PROCESS INDUSTRIES	Nov.'35	Oct.'35	Nov.'34
Explosives:			
Employment *a*	89.9	89.8	91.6
Payrolls *a*	80.2	80.2	71.2
Soap:			
Employment *a*	103.7	105.4	104.6
Payrolls *a*	98.3	101.3	92.5

	Oct. '35	Sept. '35
Exports	$2,207,000	$1,860,000
Imports	1,634,000	1,292,000
Crude sulfur, exports	878,000	620,000

a 1923-1925 = 100.0.

Dual issue involved in the Philippines' chrome shipments to Italy is being pushed toward a decision by both civilian and official sources at the Island's capital.

Mining companies involved through Courtney Whitney, representing Consolidated Mines, which is a holding company, and Judge John W. Haussermann, president of Benguet, which is an operating company, are fully in accord with American policy.

Nevertheless, in a strongly worded letter to High Commissioner Frank Murphy, Mr. Whitney declared that as an American citizen he could not escape his duty to point out that the decision puts the U. S. in a precarious position, since the decision which they are enforcing against present belligerents may later locally be enforced against the U. S. He referred to the "military engineer" showing the chromite deposits within continental U. S. are practically nil with the world supplies at present concentrated under the British, Russian, French and Turkish flags.

On the other hand the Philippines possesses what is the largest known chromium deposit in the world consisting of high-grade easily reducible ore, which at present is available to the U. S. at a reasonable price through continuing sovereignty over the Philippines. Therefore, Mr. Whitney urges that as a matter of safety the U. S. acquire the laid-down reserve while available.

Enough borax to supply the U. S. for a hundred years has been located in the Mohave Desert in Southern California, according to a report presented before the annual convention of the Geological Society of America and associated societies at the Hotel Waldorf-Astoria.

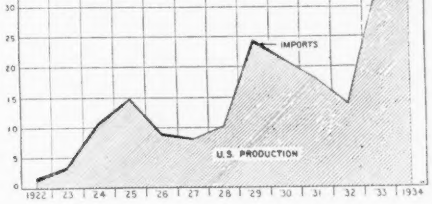
Waldemar T. Schaller of the U. S. Geological Survey, who made the report, said that the borax was solidly laid in a basin 4 miles long, a mile wide and 100 feet deep. Present annual consumption of $3,500,000 of borax by the U. S. indicates the find is worth about $350,000,000.

According to the *Manufacturers' Record*, the new Allied chlorine plant (in which no caustic is produced) will cost $1,000,000, will produce 10,000 tons of chlorine and 25,000 tons of sodium nitrate annually.

CRESYLIC ADVANCED; SHORTAGE IS ACUTE

Spot Supplies of Xylol, Toluol and Solvent Naphtha Scarce—Several Important Price Changes in Intermediates Announced — Coking Operations Reach New High—

Price revisions were announced for a number of important coal tar chemicals last month. Cresylic, both domestic and



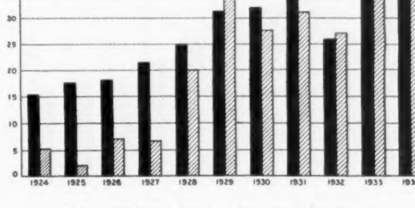
Resins cause rise in phenol imports and domestic production.

foreign-made, is scarce. This, plus increased consumption by resin manufacturers and certain oil refiners, places the item in a strong position. Smaller supplies of imported creosote oil from abroad is the reason advanced for the increase of ½c. A number of price changes for coal tar acids and intermediates were placed in effect on Jan. 1, reflecting changing manufacturing costs. Scarcity of spot supplies of benzol, toluol, xylol, and solvent naphtha continues into the new year as one of the outstanding conditions.

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Acid cresylic	$0.51	$0.45
Gamma	.80	.77
Laurent's	.46	.36
Creosote oil	.12½	.12
Benzidine Base	.72	.67
Betanaphthol	.24	.23
G. Salt	.45	.42
Pyridine	1.30	1.20
R. Salt	.52	.44
Tar acid oil, 15%	.22½	.22
25%	.24½	.24
DECLINED		
Acid Tobias	$0.70	$0.75
Paranitroaniline	.47	.48

November coke production increased substantially to the highest level since



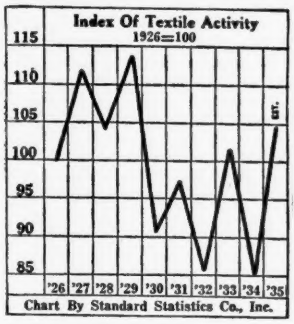
Naphthalene production and imports.

that of April, '31. November rate of 107,758 tons, from byproduct and beehive ovens, was 5.9% above that of October.

TEXTILES AND TANNING MOVE UP

After Poor 6-Month Period all Textile Branches Expand in Last Half Year—Shoe Production Exceeded Record '29 Figures—Corn Derivatives Go Lower—

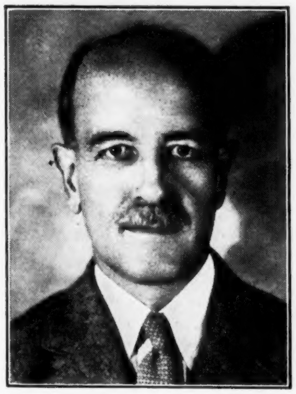
Textiles came through handsomely in the last 6 months of '35 to maintain intact the theory of the 2-year cycle. Accompanying chart shows graphically the upward turn registered in the past 12 months and also how the theory has unfailingly occurred since '26.



Continuing the "2-year cycle" textile industry spurted in '35.

Rayon has had another exceptional year. The probability is that production hit a new high for the year or very close to it.

Deliveries of non-acetate rayon to mills in November are measured by the *Rayon Organon* index of 466 which compares with 494 in October and a '34 monthly average of 353. Deliveries of non-acetate rayon for the 1st 11 months of '35 thus averaged 444 which represents an increase of 26% over the full-year '34 average index noted above. This decline from October to November was less than seasonally normal, however, and the seasonally adjusted deliveries index rose. Stocks of yarn held by producers on Nov. 30th showed no change from the end-of-October stocks at a 5-weeks' supply.



PRESIDENT WILLIAM H. CADY

WILLIAM J. KELLY, JR.

Chief Chemist Cady, U. S. Finishing, is the new head of the American Association of Textile Chemists & Colorists—500 acclaimed arrangements of Burkart, Schier's Kelly for the convention.

Wool consumption, too, has been reaching record proportions which have attracted wide interest and "explanations" are rampant. As the *Rayon Organon* views the situation, there are at least 4 reasons for this current increase, as follows: (1) There has been a great improvement in wool consumed in house furnishing items this season. (2) Low wool consumption of '33, due to the textile strike, as well as cyclical causes, created some vacuum of demand which is being filled by increased takings this year. (3) Improved industrial situation with its attendant increased usage of wool products has been important. (4) Wool promotion program, which is covering all stages from the manufacture to the distribution of wool and its products, undoubtedly has increased wool consumption in recent months. On the other hand, it would appear that some of these very reasons for the increase over the last 4 months would indicate the likelihood of some falling off early in '36.

Important Price Changes

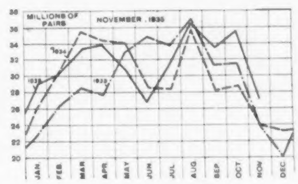
ADVANCED	Dec. 31	Nov. 30
Cutch, Philippine	$0.04	$0.03¾
Valonia beards	58.00	50.00
Cups	49.00	34.00
DECLINED		
Dextrine, British Gum	$3.85	$4.00
Corn	3.60	3.75
Egg yolk, imp.	.54	.56
Mangrove bark	26.00	27.00
Starch, pearl	3.13	3.28
Powd.	3.23	3.38
Sumac, grd.	54.00	60.00

Cotton production, which responded more slowly than either rayon, silk or wool, closed out the year in good proportions. Cotton consumption in November totalled 507,836 bales of lint and 59,549 of linters, the best November since '29. October takings totalled 552,187 and 67,106 bales and figures for November of '34 were 480,081 and 51,035 bales respectively.

Silk, on the whole, enjoyed a good year even though some tapering off was experienced in the final quarter. Raw silk imports during November totaled 41,693 bales, a decrease of 25.9% under October and of 12.4% under the same month a year ago. Approximate deliveries of raw silk to domestic mills during the month were 37,012 bales, a drop of 23.2% as compared with October and 1.4% under a year ago.

Will the 2-year cycle theory hold true to form in '36 or will the wave of business improvement carry the textile industry on to new high levels? Industry opinion is quite divided, with some looking for still better business in '36 and others apprehensive. Rayon prices have been advanced finally, and how much forward buying took place no one knows accurately. Rayon and silk dyeing and finishing concerns have advanced their prices, and there is much fear of labor troubles in some branches of the textile field early next Spring.

Shoe production in '35 exceeded the '29 record by approximately 10,000,000 pairs. This was caused largely by heavy purchasing in the fall months in anticipation of price advances, but shoe manufacturers are predicting that '36 production will at least equal the 361,000,000 pairs turned out in '29.



'35 shoe production sets a new high.

High rate of '35 production was due to the feverish manufacturing activity in August, September and October, for previous to these months production was running about 2% below that of '34. Because of the admittedly forward buying this fall, stocks on hand are higher than usual. But if sales are somewhat lower, shoe manufacturers will be happier because of higher prices. Still much of the 15% general price increase will be lost in higher leather costs, for tanners have been forced to introduce higher price levels.

Tanners are apprehensive of the proposed Government hide stock sales plan. These holdings are reported at 1,500,000 cattle hides and 500,000 calf and kip skins, Recently the Tanners' Council suggested that the Government should offer from 5 to 10% of its holdings monthly so as not to disturb the market unduly, but, todate, the Government's policy continues to be to offer these hides "in quantities and at times where we believe the market can absorb them without undue disturbance."

Meantime producers of chemicals for the tanning field are interested in a PWA tannery at Mills, near Casper, Wyo., where 360,000 sheep pelts, a number of cattle, elk and goat hides are ready for processing.

December trade in dyestuffs and tanstuffs was somewhat below earlier estimates but the volume for the 12 months was satisfactory, according to leading factors in both groups. Suppliers of textile specialties and chemicals to the field,

however, reported shipments seasonally good. The tanstuffs market was featured by a sharp increase in valonia beards and cups with light offerings. Mangrove bark and ground sumac were, on the other hand, off slightly from the November levels. Lower corn quotations brought about reductions in starch and dextrin. Bichromate producers report nearly all consumers signed at the higher price level.

Dr. E. W. Pierce, technician of the Ciba Co., declared in an interview at the convention of the American Association of Textile Chemists and Colorists that the Tennessee valley's opportunity to become an electro-chemical center 2nd or equal to the Niagara Falls region can be realized only if taxes are reduced.

Such an opportunity for the electro-manufacture of heavier chemicals undoubtedly confronts the valley, but capital will remain wary of investing as long as the threat of increased taxes persists, Dr. Pierce said.

Ciba, manufacturers of chemicals and dyestuffs, will open a new office, laboratory, and warehouse in Charlotte by the middle of January.

Ciba company will maintain its present branch offices in Greensboro and Greenville, S. C., in addition to opening the big plant in Charlotte. Samuel L. Hayes will be manager of the Charlotte branch.

A Regional meeting of the Research Laboratory of the Tanners' Council of America was held at the Hawthorne Hotel, Salem, Mass., last month. Dr. Fred O'Flaherty, director of the Research Laboratory at the University of Cincinnati, Cincinnati, was present to inform the group of tanners and their technical assistants who assembled concerning the past researches conducted by the laboratory and also to discuss the present extensive program.

Complaints of textile manufacturers that both foreign and domestic markets are closed to them because of inability to cope with exceptionally low Japanese prices have moved the State Department to extract from the Japanese Government the latter's promise to voluntarily limit her shipments of textiles to this country. Long-sought "gentleman's agreement" was entered into Dec. 21.

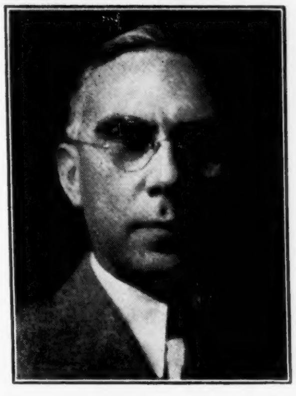
P. H. Doremus & Co., 222 W. Broadway, Paterson, N. J., was recently appointed as N. J. district sales headquarters for U. S. Oil of Providence. Mr. Doremus is well known in the chemical supply business.

"Burnt" Shades and "Club Colors" are important fashion themes highlighted in the collection of 12 Spring hosiery shades just released by the Textile Color Card Association to its members.

COMPETITION DRIVES ROCK PRICES DOWN

Industry Awaits Effect of Low Rock Prices on Superphosphate—Nitrate and Potash Schedules Extended—Fertilizer Exports Remain at High Level—Superphosphate Production Rises Seasonally—

Phosphate rock schedules were thrown into the discard last month in a wild scramble by producers for contracts. In some cases it is reported that consumers have signed long-term contracts at figures approximately half of the former price level. Unquestionably this action will have a serious reaction on "super" prices but to date no price revisions have been made. The bulk superphosphate committee of the N. F. A. was to have met Dec. 20th but the meeting was postponed indefinitely.



N.F.A. PRESIDENT, A. D. STROBHAR
He takes up the reins laid down by the late President Melvin.

Important Price Changes

ADVANCED		
	Dec. 31	Nov. 30
Blood, Chicago	$3.35	$3.00
DECLINED		
Castor pomace	16.00	16.50
Nitrogenous Material	1.90	2.00
Tankage, grd., N. Y.	2.85	2.90
DEPT. OF LABOR STATISTICS		
	Oct. '35	Sept. '35
Fertilizers & Materials:		
Exports	$1,851,000	$1,852,000
Imports	1,456,000	1,051,000

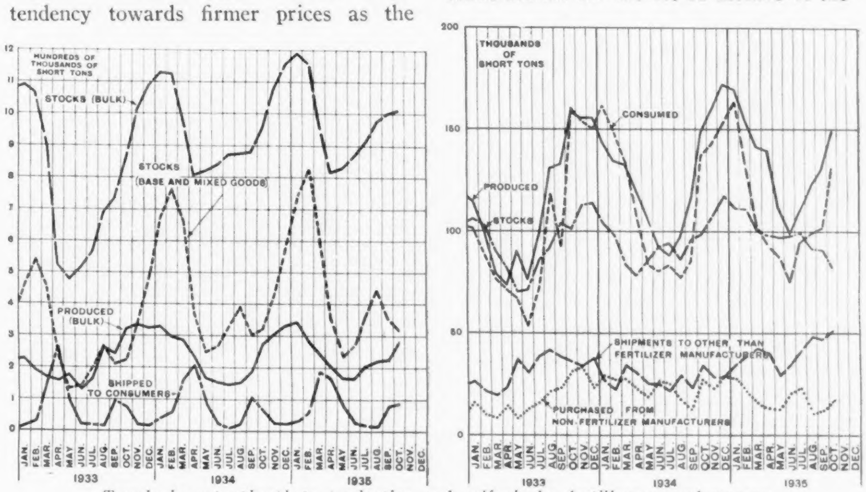
Nitrate of soda quotations have been extended unchanged through June. The organic ammoniates again showed further tendency towards firmer prices as the actual mixing period is approached. Nothing has been heard of in the trade on future potash prices that is authoritative enough to quote.*

November fertilizer tag sales were 2% under November a year ago but November sales are unimportant, accounting for only 2% of the year's total. Analysis of the sales will be found on page 65 of this issue.

* Schedule is renewed on Jan. 5th.

Superphosphate production showed about the usual seasonal increase from October to November, according to reports by acidulators of the N. F. A. Output in the plants of reporting firms totaled 247,178 tons during the month, 5.7% under production in November, '34. Decline from last year was due entirely to smaller production in the South, as a slight increase was reported by producers in the Northern Area. Production in the 1st 11 months of this year was 5% larger than in the January-November period of '34, with a 10% rise occurring in the North and with Southern output remaining about the same.

There was a sharp seasonal decline in shipments to consumers from October to November, but the amount of such shipments was the largest for any November in the past several years. There was a small decline for the 1st 11 months of the year from the corresponding period of '34. Shipments of superphosphate in base and mixed goods in November remained above the level of the preceding year.



Trends in superphosphate production and sulfuric by fertilizer manufacturers are shown graphically.

Seasonal rise in stocks of bulk superphosphate which has been in progress since April continued in November, with the amount rising above the 1,000,000 ton mark for the 1st time since February, '32. Stocks in base and mixed goods were somewhat larger than a year ago but are

well under the peak of last Spring. Total stocks rose 14% in November and 9% in the last year.

October exports of fertilizers and fertilizer materials remained at a relatively high level. Totaling 161,955 tons with a valuation of $1,850,702, gain over October, '34, was 20% in tonnage and 30% in value. For the 1st 10 months exports were 13% larger in volume and also 13% larger in value than in the corresponding period of last year. Increase in October over last year was due to larger exports of "Other nitrogenous chemicals" (principally domestic synthetic sodium nitrate) and phosphate rock.

October imports totaled 71,956 tons with a value of $1,624,094. As compared with the same month of last year there was a decline of 12% in volume and 4% in value. For the January-October period there were gains over the corresponding period of '34 of 1.7% in tonnage and 0.9% in value. Decline in October from last year was the result of a sharp drop in imports of potash salts; there was a rise in nitrogenous material imports. For the year to date, however, imports of nitrogen carriers have been moderately smaller than last year while a substantial increase has been registered by potash imports.

Upward trend in ammonium sulfate production which had been in progress in recent months continued in October, with the month showing a gain of 7.1% over October, '34. Production in the 1st 10 months of this year at by-product coke plants amounted to 429,803 tons, compared with 400,700 tons in the same period of '34.

A. Olivier, a well-known figure in the fertilizer brokerage business, and a member of the firm of Olivier & Waterbury, has just been appointed as acting French Consular Agent at Norfolk. Position is largely an honorary one and Mr. Olivier will continue as an active partner.

Potash Co. of America, after 4 years of careful planning, construction and thorough experimentation, is now in commercial production of high-grade muriate.

G. Ober & Sons, Baltimore fertilizer producer, acquires Meadows Fertilizer of New Bern, N. C.

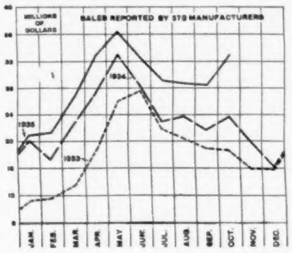
Animal by-product imports from the Argentine show increases, as do the totals on shipments of bones.

Jap fish-meal exports to the U. S. are increasing. For the 1st 9 months total is 18,284 tons. Receipts at N. Y. City in that period were 5,181 tons, Baltimore, 3,312 tons.

CHROME YELLOW QUOTATION SINKS TO 11c

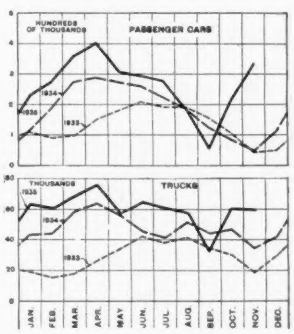
Competitive Situation Unchanged as 3 Separate Reductions are Announced—Ultramarine Priced 1c Higher—Paint Materials Slow at Year-End but Year's Volume Satisfactory—

Feature of the raw paint materials market is the pronounced weakness in chrome yellow. Fifth reduction this year and the 3rd in December brings the contract quotation to 11c, and this despite higher bichromate prices and firm lead quotations. Direct cause, of course, is a "price war" between certain factors in the industry. No one in the trade will venture an opinion when this will be "patched up." Ultramarine prices are 1c higher for '36, and producers reported the majority of consumers already under contract. Iron blues are ½c higher for '36 contracts. Producers of bone black, lamp blacks, barytes, and blanc fixe are renewing contracts at unchanged levels. Paint makers are taking, according to reports, heavy shipments of zinc oxide, considering the present prices highly favorable. Market for varnish gums was quiet and several reductions were made.



'35 paint sales were the best in 5 years, with the outlook for '36 still more promising.

Aided by earlier models this year, 4th quarter automotive production reached a figure 3 times that of a year ago and the largest for the period in the history of the industry. Total for year (best since '29) was approximately 4,155,404 units divided as follows: 1st quarter, 1,109,047; 2nd, 1,253,373; 3rd, 692,984, and 4th, approximately 1,100,000. Best minds in the industry are now talking a 10% increase in '36 production over the '35 figure. Some contraction in sales is expected in the early spring months due to the heavy sales in the last quarter of '35 but a decided pick-up is then anticipated for the late spring. Also, production figures would necessarily have to be revised upwards if the soldiers' bonus is paid.



'35 auto output only 5% below '23-'29 average

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Blue, ultramarine	(all grades 1c)	
Blue, iron	$0.37	$0.36½
Rottenstone	35.00	23.50
DECLINED		
Chrome yellow	$0.11	$0.12

DEPT. OF LABOR STATISTICS

	Nov.'35	Oct.'35	Nov.'34
Employment a	109.3	109.2	99.7
Payrolls a	94.0	94.8	78.5

	Oct. '35	Sept. '35
Pigments, Paints and Varnish, exports	$1,241,000	$1,352,000

a 1923-25 = 100.0.

N. P. V. & L. A. has negotiated a plan whereby the National Homes Finance Corp. will finance painting jobs for class A, B and E members of the Association.

Pittsburgh Plate Glass is showing a 50% increase in sales of plate glass and 25% in paint, with '36 to see still further improvement, according to H. B. Higgins, vice-president. Salaries and wages of the company, according to Mr. Higgins will reach $20,000,000 for '35, an increase of 33% over '34.

MERCURY IN STRONG POSITION

Mercury continued to go higher in the last month of the year and shortage of domestic material is reported in some quarters. Mercurials have failed to date to show a proportional rise due to the keen state of competition existing between the various makers. Silver prices "cracked open" last month and silver nitrate declined sharply as a result. Bismuth salts are unchanged in price despite the higher quotations for the metal but, according to certain factors in the trade, this condition may not exist much longer. Somewhat unexpected was the increase made in U. S. P. boric, but manufacturers state that the higher levels more truly reflect the costs of production. The vanillin market was "upped" 25c due to higher costs for raw materials.

Important Price Changes

ADVANCED	Dec. 31	Nov. 30
Acid Boric, U. S. P., bbls.	$130.00	$120.00
Corrosive sublimate	.76	.71
Mercury	76.00	75.00
Vanillin, ex eugenol	3.75	3.50
ex guaiacol	3.65	3.40
DECLINED		
Silver nitrate	$0.36⅜	$0.44⅝

DEPT. OF LABOR STATISTICS

	Nov.'35	Oct.'35	Nov.'34
Employment, Drug-gist's preparations a	100.3	101.6	105.5
Payrolls, Druggist's preparations a	94.7	99.9	96.8

a 1923-1925 = 100.0.

4c BREAK OCCURS IN ANTI-FREEZE PRICES

Solvent Shipments in '35 in Satisfactory Volume, Largely through Improvement in Automotive Demand — Hydrogenated Naphtha Reduced 1c in the East—

Shipments of solvents declined in the last half of the month as the inventory period approached. Looking backwards over the year, however, volume of pe-

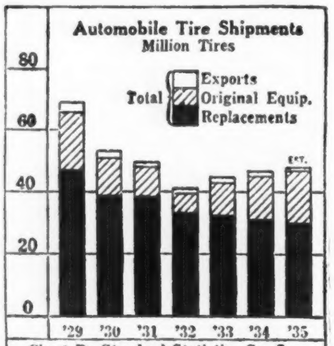


Chart By Standard Statistics Co., Inc.

troleum, coal tar and other solvents reached a peak for the depression period. Much of this improvement can be directly traced to the sharp rise in automotive and tire manufacturing activity.

Gains made in '35 in automobile production are reviewed in detail in the Lacquer Section. A glance at the accompanying chart shows clearly that the expected decline in sale of tires for re-

Important Price Changes

ADVANCED

	Dec. 31	Nov. 30
Hydrogenated naphthas	$0.16	$0.15

DECLINED

Alcohol, CD5a and 10	$0.44	$0.49

DEPT. OF LABOR STATISTICS

	Nov.'35	Oct.'35	Nov.'34
Petroleum Refining:			
Employment a	110.1	z110.9	111.9
Payrolls a	98.3	z102.2	96.8

	Oct. '35	Sept. '35
Petroleum & Products:		
Exports	$19,648,000	$23,119,000
Imports	3,164,000	4,006,000

a 1923-25=100.0; z Revised.

placement was more than off-set by the increase in the sale of original equipment. Increased sales and better earnings by the tire companies is the outlook for '36. Ruinous price "wars" are unlikely to recur this year.

The one solvent price change in Decemwas a 1c advance on No. 1 grade of hydrogenated naphtha, bringing the present quotation to 16c in tanks, freight allowed in the East.

Anti-freeze alcohol (formulas 5a and 10) is off 5c to a basis of 44c in certain areas due to competition, causing serious doubts to arise as to the ultimate success of the new marketing policy adopted this fall. Schedules for specially denatured and pure were extended into the 1st quarter unchanged from existing levels.

Agricultural Power-Alcohol Corp., newly formed at Omaha, Neb., will make commercial alcohol from farm products and also will make alcohol for blending with gasoline for use in fuel blends. An old distillery has been taken over and approximately $100,000 will be spent on renovation and equipment. Bert LeBron, of the LeBron Electric Works of Omaha, is reported as the chief backer of the enterprise, and according to reports, he is quoted as saying that 20 similar plants will be eventually in operation in Nebraska alone.

COURT REFUSES REVIEW

General Chemical Gains Point in Litigation over Sulfuric Patent against Standard Wholesale Phosphate—Safety Glass Sent to Trial

For the 2nd time the Supreme Court refused to review the patent litigation between General Chemical and Standard Wholesale Phosphate & Acid Works involving the production of sulfuric.

Question involved was whether or not General had delayed in filing a disclaimer of a claim in the patent which had been held invalid by a Federal court in other litigation. Company waited 38 days after the Supreme Court had refused to review the earlier decision before filing a disclaimer with the U. S. Patent Office and asking for reissue of the patent with different claims. Standard Wholesale Phosphate & Acid Works claimed that 30 days was the limit for such action and the reissued patent was therefore invalid.

Judge George P. Hahn, sitting in Federal Court in Toledo, has ordered to trial suit of Celluloid against Libbey-Owens-Ford Glass for alleged infringement on patents on making of laminated (safety) glass.

Acticarbone Corp. filed suit against National Carbon in the U. S. District Court for the Southern District of New York. Suit seeks an adjudication of their respective rights under the Acticarbone patents and Cheney patents of National Carbon.

Statistics of Business

	November 1935	November 1934	October 1935	October 1934	September 1935	September 1934
Automotive production	295,927	76,353	206,612	132,488	89,805	170,007
Bldg. contracts*‡	$188,115	$111,692	$200,596	$135,225	$167,376	$110,151
Failures, Dun & Bradstreet	927	923	1,097	1,091	806	790
Merchandise imports‡	$168,955	$150,919	$189,240	$129,635	$161,653	$131,658
Merchandise exports‡	$269,400	$194,712	$221,215	$206,413	$198,189	$191,313
Newsprint Production						
Canada, tons	262,854	240,869	265,515	235,021	223,892	196,172
U. S., tons	78,929	74,933	79,746	80,572	71,416	74,117
Newfoundland, tons	28,567	28,713	29,744	25,321	27,161	25,847
Mexico, tons	2,045	1,756	1,942	1,953	1,540	1,750
Total, tons	372,395	346,271	377,947	342,867	324,009	297,886
Plate glass prod., sq. ft.	15,909,262	6,587,366	16,592,803	7,512,052	14,404,060	6,737,782
Steel ingots production	3,153,247	1,610,625	3,146,446	1,481,902	2,829,835	1,268,977
Steel activity, % capacity	54.78	27.76	52.64	24.59	51.13	23.05
Pig iron production, tons	2,065,913	956,940	1,978,411	951,062	1,776,476	898,000
U. S. consumption, crude rubber, tons	......	......	42,436	31,253	37,553	30,352
Tire shipments	......	......	......	......	5,375,000	5,877,000
Tire production	......	......	......	......	6,432,000	5,880,000
Tire inventory	......	......	......	......	12,877,000	15,610,000
Dept. of Labor Indices†						
Factory payrolls, totals†	74.5	59.5	75.0	60.7	72.1	z58.0
Factory employment†	84.8	76.9	85.2	78.6	83.6	z75.9
Chemical price index†	......	......	......	......	80.3	84.3
Chemical employment†a	112.3	108.6	113.1	109.4	110.7	107.6
Chemical payrolls†a	98.9	90.9	100.6	91.6	z99.0	87.9
Chemicals and Related Products						
Exports‡	......	......	$3,959	$7,793	$8,692	$7,737
Imports‡	......	......	$5,010	$4,955	$4,530	$4,184
Stocks, mfd. goods†	......	......	......	......	119	121
Stocks, raw materials†	......	......	......	......	99	109
Cement prod., ratio of prod. to capacity	26.2	32.2	33.1	29.3	32.6	34.8
Anthracite prod., tons	2,868,490	3,600,652	3,681,252	4,729,000	4,172,000	3,977,000
Bituminous prod., tons	y33,010,000	30,856,000	y36,697,000	32,807,000	24,944,000	27,772,000
Boot and shoe prod.	......	......	......	......	33,149,780	28,183,793

Week Ending	Carloadings 1935	Carloadings 1934	Carloadings % of Change	Electrical Output§ 1935	Electrical Output§ 1934	Electrical Output§ % of Change	Jour. of Com. Price Index	National Fertilizer Association Indices: Fats & Oils	Chem. & Drugs	Mixed Fert.	Fert. Mat.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Nov. 30	570,427	488,185	+16.8	1,876,684	1,683,590	+11.5	81.6	80.9	95.6	70.6	65.8	80.1	81.0	56.4	95.4	118.4
Dec. 7	637,133	551,485	+15.5	1,969,662	1,743,427	+13.0	81.1	81.4	95.6	70.6	64.5	79.9	80.7	55.7	94.4	118.3
Dec. 14	615,237	580,202	+ 6.0	1,983,431	1,767,418	+12.2	80.5	79.0	95.6	70.7	64.5	79.4	80.5	54.6	....	119.0
Dec. 21	599,534	548,478	+ 9.3	2,002,005	1,787,936	+12.0	80.2	79.7	94.7	70.7	64.4	79.5	80.2	49.5	....	118.6
Dec. 28	......	......	.....	....	....	.....	81.3	80.5	94.7	70.7	64.4	79.3	....	46.7	....	118.9

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; a Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; y Preliminary; z Revised.

Aluminum Acetate 20% Solution

NIACET PRODUCTS

Acetic Acid Glacial and U.S.P.
Acetal
Acetamide
Acetaldol
Paraldehyde
Acetaldehyde
Crotonic Acid
Iron Acetates
Methyl Acetate
Crotonaldehyde
Aluminum Acetate
Aluminum Formate
Sucrose Octa Acetate
Other Acetate Salts

SPECIFICATIONS

Aluminum Acetate	19.5% to 20.8%
Al_2O_3	4.9% to 5.2%
Free Acid	½% maximum
pH	3.3 minimum
Chlorides	Negligible
Sulphates	Negligible
Color	Water white to pale yellow
Sp. G.	1.087 to 1.093 @ 20°C.
Weight	9.1 lbs. per gal. @ 20°C.

CONTAINERS

Non-returnable	Net Weight
10 gal. Kegs	90 lbs.
50 gal. Barrels	450 lbs.

There are no shipping restrictions

The waterproofing of textile products may be carried out with NIACET ALUMINUM ACETATE alone or in conjunction with wax emulsions. Laundries find better results are secured with less material in the waterproofing of fabrics against dampness, rain, perspiration, or accidental spillage when using Niacet Aluminum Acetate.

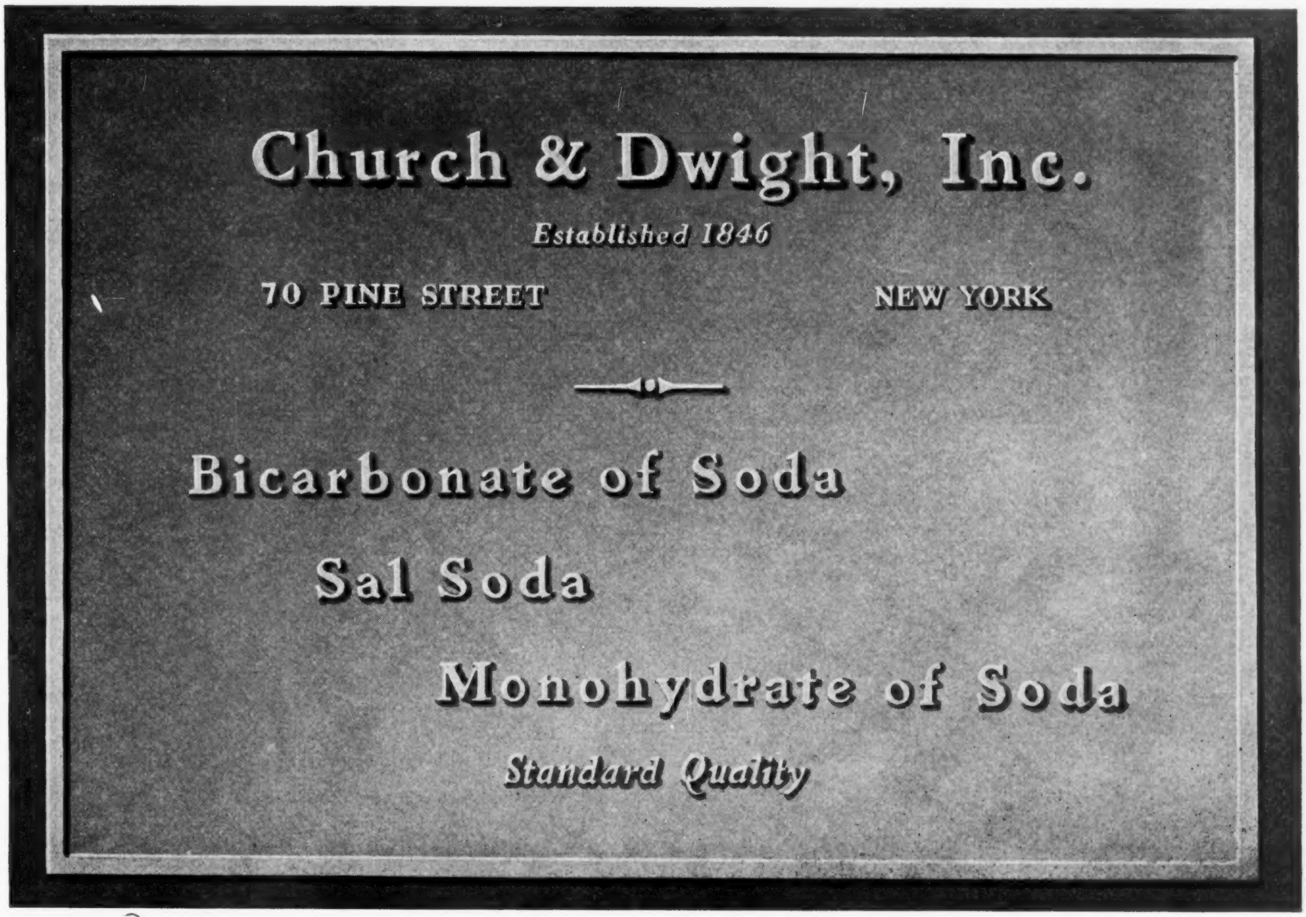
Paper products may be waterproofed throughout or on the surface only by similar treatments. When Niacet Aluminum Acetate is applied to glue sized or glue surface treated papers the glue is insolubilized and the surface becomes remarkably water repellent.

In dyeworks it functions as a mordant for cotton dyes, and as a base for color lakes, and finds further application in printing fabrics.

Basic Aluminum Acetate powder and a 30% Aluminum Formate Solution are also available. Samples of these products and quotations on your requirements furnished on request.

NIACET CHEMICALS CORPORATION

Sales Office and Plant ∴ Niagara Falls, N. Y.



CHEMICAL STOCKS OPEN '36 FIRM

Chemical Companies' Earnings Statements are Generally Favorable—American Commercial Alcohol's Net Off for 1st 9 Months—Several Companies Reduce Dividend Rate on Preferred Shares—

Chemical stocks had a remarkable rise in '35 and as a group received special attention from investors looking for good yield and a satisfactory hedge in the event of inflation. Towards the end of the year interest fell off somewhat as dividend yield compared to prices made such purchasing less attractive.

Almost without exception earnings statements for the 1st 9 months of '35 showed heavy gains as the following examples taken at random show:

	1935	1934
	9 Mos. End. Sept. 30	
Air Reduc.	$3,895,788	$3,077,199
du Pont	40,154,667	38,727,818
Monsanto Chem.	2,732,999	1,945,230
Union Car. & Car.	16,780,882	13,469,600

Report of American Commercial Alcohol and wholly owned subsidiaries for 9 months ended Sept. 30, subject to audit and year-end adjustment, shows profit of $809,280 after interest, provision for doubful accounts receivable, reserve for depreciation, federal taxes and other charges. After deducting $600,000 appropriation for reserve for estimated unrealized profit on sales subject to deferred delivery, there was a balance of $209,280 carried to earned surplus.

In 1st 9 months of '34 company reported net profit of $1,109,373 after interest, depreciation, federal taxes and other charges.

Merck stockholders approved Dec. 12 a reduction in the dividend rate of the 8% cumulative preferred stock to 6% annually. There are outstanding 51,395 shares of preferred and 300,000 shares of common.

George W. Merck, president, said investment banking firms had offered to underwrite an issue of 5½% preferred stock, to retire outstanding preferred at the call price of $115 a share. Under this arrangement, however, Mr. Merck said, preferred stockholders would have a taxable capital gain while with the reduction in the rate, no taxable gain results.

Action of Hercules and Merck in obtaining stockholders' consent to dividend rate reductions on preferred focuses attention on other companies in the chemical field with preferred of one type or another outstanding that could be called with resulting dividend savings. Following table lists some callable preferred stocks of chemical companies listed on the N. Y. Stock Exchange:

7% Preferred Stocks

Company	Shares	Yield	Current price	Call price	Earnings last year
Allied Chem.	345,540	5.5	126½	120	17,548,355
Archer-Dan. Mid.	30,860	5.1	120	115	2,525,745
Armour, Del.	583,773	6.5	107¾	110	8,235,835
Devoe & R. 1st	11,452	5.9	119	115	459,513
Devoe & R. 2nd	8,940	..	...	115	459,513
Glidden Co.	65,000	6.4	109½	105	1,532,324
Int. Nickel	276,278	5.5	128	120	18,080,827

Following table shows non-callable preferred stocks:

7% Preferred Stocks

	Shares	Yield	Price	Earnings
Corn Products	250,000	4.4	157⅛	9,702,696
Eastman Kodak	61,657	4.5	155½	14,503,247
Mathieson Alk.	23,777	4.7	147½	1,165,836
National Lead	34,883	4.3	160½	4,200,188
U. S. Gypsum	78,922	4.3	160	2,155,369
6% Preferred Stocks				
National Lead	25,815	4.3	137	4,200,188

At least one authoritative source, according to the *Wall St. Journal*, denies the gossip in the Street that A. A. C. directors are considering retiring some 50,000 shares of capital stock around $60 a share.

Cyanamid directors have increased its Class A and B common dividends for the final quarter to 15c from 10c payments made in 4 previous periods. Union Carbide advanced its dividends to 50c from 40c paid in 3 previous quarters.

Directors of Hercules Powder have declared on Nov. 27 a quarterly dividend of 75c a share and an extra of 50c a share on the company's common.

Price Trend of Chemical Company Stocks

	Nov. 30	Dec. 7	Dec. 13	Dec. 20	Dec. 27	Dec. 31	Net gain or loss last month	Price on Dec. 31, 1934	1935 High	1935 Low
Air Reduction	171	168	163⅝	165½	167½	169	— 2	112½	173	104⅜
Allied Chemical	162¼	161¼	155½	146½	151½	157⅝	— 4⅝	137½	173	125
Columbian Carbon	93½	95	94	95	93¾	96½	+ 3	74¾	101¼	67
Com. Solvents	20⅜	20⅞	20⅝	20¼	21	21⅝	+ 1¼	21⅝	23⅞	16½
du Pont	137¼	139	136¼	135¾	139¼	139½	+ 2¼	95⅝	146½	86⅝
Hercules Powder	†85¼	83½	83	82⅝	86¾	87	+ 1¾	74½	90	71
Mathieson	31¾	31½	30⅛	29⅞	30	30¼	— 1½	28⅝	33⅞	23¾
Monsanto	90	80¾	86	86½	87½	89	— 1	59	94¾	55
Std. of N. J.	48¼	48⅝	48⅜	48⅞	49	51¾	+ 3½	.....	52⅜	35¾
Texas Gulf S.	32⅛	31¼	30½	31	32	33¼	+ 1⅛	34¼	36¾	28¾
Union Carbide	71¾	72	70	70	70½	71½	— ¼	47⅛	75¾	44
U. S. I.	47¼	47⅝	46	43	43	43	— 4¼	44½	50⅝	35⅛

† Nov. 29.

Dividends and Dates

Name	Div.	Stock Record	Payable
Abbott Laboratories	50c	Dec. 18	Jan. 2
Abbott Laboratories, extra	25c	Dec. 18	Jan. 2
Air Reduction	75c	Dec. 31	Jan. 15
Allied Chem. & Dye, pf.	$1.75	Dec. 11	Jan. 2
Am. Cyanamid, A. & B.	15c	Dec. 14	Dec. 31
Amer. Maize Prod.	25c	Dec. 23	Dec. 31
Amer. Maize Prod., pf.	$1.75	Dec. 23	Dec. 31
Amer. Smelt. & Rfg.	40c	Jan. 31	Feb. 28
Amer. Smelt. & Rfg., 1st pf.	$1.75	Jan. 10	Jan. 31
Amer. Smelt. & Rfg., 2nd pf.	$1.50	Jan. 10	Jan. 31
California Ink	50c	Dec. 21	Jan. 2
Canad. Celanese, 7% part pf.	$1.75	Dec. 17	Dec. 31
Celanese of Amer., 7% pr. pf.	$1.75	Dec. 17	Jan. 1
Celanese of Amer., 1st pf.	$3.50	Dec. 17	Dec. 31
Chichasha Cotton Oil, Sp.	50c	Dec. 9	Jan. 2
Clorox Chem., extra	12½c	Dec. 20	Jan. 1
Clorox Chem.	50c	Dec. 20	Jan. 1
Colgate-Palmolive-Peet, pf.	$1.50	Dec. 5	Jan. 1
Comm. Solvents	30c	Dec. 2	Dec. 31
Cons. Chem. Ind., A	37½c	Jan. 15	Feb. 1
Cont.-Diam'd Fibre	50c	Dec. 16	Dec. 30
Devoe & Raynolds, A	25c	Dec. 18	Jan. 2
Devoe & Raynolds, B, extra	25c	Dec. 18	Jan. 2
Devoe & Raynolds, B	25c	Dec. 18	Jan. 2
Devoe & Raynolds, 1st pf.	$1.75	Dec. 18	Jan. 2
Devoe & Raynolds, 2nd pf.	$1.75	Dec. 18	Jan. 2
Devoe & Raynolds, A, extra	25c	Dec. 18	Jan. 2
du Pont, deb.	$1.50	Jan. 10	Jan. 25
Eagle Picher Lead, new 6% cum. pf.	$1.50	Dec. 28	Dec. 31
Eastman Kodak, extra	25c	Dec. 5	Jan. 2
Eastman Kodak	$1.25	Dec. 5	Jan. 2
Eastman Kodak, pf.	$1.50	Dec. 5	Jan. 2
Freeport Texas, pf.	$1.50	Jan. 15	Feb. 3
General Print. Ink, extra	50c	Dec. 17	Dec. 31
General Print. Ink	40c	Dec. 17	Dec. 31
General Print. Ink, pf.	$1.50	Dec. 17	Jan. 2
Glidden	50c	Dec. 16	Jan. 2
Glidden, prior pf.	$1.75	Dec. 16	Jan. 2
Gold Dust	30c	Jan. 10	Feb. 1
Gold Dust, $6 pf.	$1.50	Dec. 17	Dec. 31
Hazel-Atlas Glass	$1.25	Dec. 14	Jan. 1
Hercules Pwd., pf.	$1.75	Feb. 4	Feb. 15
Indus. Rayon	42c	Dec. 20	Jan. 1
Int'l Nickel	25c	Dec. 2	Dec. 31
Int'l Nickel, pf.	$1.75	Jan. 2	Feb. 1
Int'l Print. Ink	35c	Jan. 13	Feb. 1
Int'l Print Ink, pf.	$1.50	Jan. 13	Feb. 1
Int'l Salt	37½c	Dec. 16	Jan. 2
Int'l Silver, pf.		no action	
Koppers Gas & Coke, pf.	$1.50	Dec. 12	Jan. 2
Merck	10c	Dec. 23	Jan. 1
Merck, pf.	$2.00	Dec. 23	Jan. 1
Monroe Chem, pf.	87½c	Dec. 14	Jan. 1
Nat'l Lead	$1.25	Dec. 13	Dec. 31
Nat'l Lead, extra	$1.00	Dec. 13	Dec. 31
Nat'l Lead, pf. B	$1.50	Jan. 17	Feb. 1
N. J. Zinc	50c	Jan. 20	Feb. 10
N. Am. Rayon, Cl. A	50c	Dec. 23	Jan. 1
N. Am. Rayon, Cl. B	50c	Dec. 23	Jan. 1
N. Am. Rayon, prior pf.	75c	Dec. 23	Jan. 1
Parker Rust Proof	$1.12½	Feb. 10	Feb. 20
Penn. Salt	75c	Dec. 31	Jan. 15
Pittsburgh Plate Glass	50c	Dec. 10	Jan. 2
P. & G., 8% pf.	$2.00	Dec. 24	Jan. 15
Sher.-Williams Ltd., pf.	$1.75	Dec. 15	Jan. 2
Spencer-Kellogg	40c	Dec. 15	Dec. 30
Std. Oil of Ohio, pf.	$1.25	Dec. 31	Jan. 15
Tubize-Chatillon, 7% pf.	$1.75	Dec. 10	Jan. 2
United Carbon	60c	Dec. 16	Jan. 1
United Dyewood, pf.	$1.75	Dec. 13	Jan. 2
U. S. I.	50c	Dec. 16	Jan. 2
U. S. Smelt., Rfg. & Mng.	$5.00	Dec. 30	Jan. 15
U. S. Smelt., Rfg. & Mng., pf.	87½c	Dec. 30	Jan. 15
Westvaco, pf.	$1.75	Dec. 16	Jan. 2

Chemical Stocks and Bonds

1935 December Last	1935 December High	1935 December Low	1934 High	1934 Low	1933 High	1933 Low	Sales: Number of shares December	Sales: Number of shares 1935	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1935	Earnings $-per share-$ 1934
NEW YORK STOCK EXCHANGE														
169	173	104⅜	113	91¾	112	47½	14,700	153,300	Air Reduction	No	841,288	$5.50	4.98	3.79
157⅝	173	125	160¾	115⅛	152	70¾	29,700	260,600	Allied Chem. & Dye	No	2,214,099	6.00	6.83	5.50
124	129	122½	130	122⅛	125	115	1,600	24,400	7% cum. pfd.	100	345,540	7.00	50.79	42.24
51½	57¾	41½	48	25¼	35	7¼	3,500	150,400	Amer. Agric. Chem.	100	315,701	2.00	6.37	p4.19
29⅛	35¾	22½	62½	20¾	89⅞	13	31,200	438,500	Amer. Com. Alcohol	20	260,716	None	3.57	4.56
44¾	52	36	39⅛	26¼	29¼	9¾	9,500	131,800	Archer-Dan-Midland	No	541,546	1.50	p4.21	p3.82
48½	48½	32¾	55½	35¼	39⅛	9	3,600	107,600	Atlas Powder Co.	No	234,235	2.00	2.49	.74
113	115	106¾	106¾	83	83⅛	60	120	6,780	6% cum. pfd.	100	88,781	6.00	13.54	8.38
29	35⅜	19½	44⅞	17⅛	58⅞	4½	90,400	1,283,400	Celanese Corp. Amer.	No	987,800	None	1.25	3.32
20	21	15⅛	18⅛	9⅛	22⅛	7	106,000	621,800	Colgate-Palm.-Peet	No	1,985,812	.75	1.16	— .57
105	107¼	101	102½	68½	88	49	1,400	23,900	6% pfd.	100	254,500	6.00	15.14	1.51
96½	101¼	67	77¼	58	71½	23⅛	9,800	217,200	Columbian Carbon	No	538,154	3.40	3.93	2.17
21⅝	23⅞	16½	36¾	15¾	57¼	9	243,600	2,193,800	Commer. Solvents	No	2,635,371	.85	.89	.88
69	78⅜	60	84½	55½	90⅝	45⅜	31,500	448,400	Corn Products	25	2,530,000	3.00	3.16	3.87
161	165	148¼	150½	135	145¾	117½	1,400	11,800	7% cum. pfd.	100	243,739	7.00	39.65	46.02
40½	50⅜	35½	55¼	29	33⅞	10	2,300	36,300	Devoe & Rayn. A	No	95,000	2.00	2.36	3.82
139½	146½	86⅝	103⅞	80	95⅞	32⅛	52,400	938,250	DuPont de Nemours	20	10,871,997	3.45	3.63	2.93
131	132	126⅞	128½	115	117	97½	1,500	39,600	6% cum. deb.	100	1,092,699	6.00	42.73	35.58
156⅛	172¼	110½	116½	79	89¾	46	15,200	229,300	Eastman Kodak	No	2,250,921	5.75	6.28	4.76
160	164	141	147	120	130	110	390	6,040	6% cum. pfd.	100	61,657	6.00	235.22	180.34
30¼	30⅝	17¼	50⅜	21½	49⅜	16⅛	25,600	347,450	Freeport Texas	10	784,664	1.00	1.76	3.01
122	125	112½	160⅛	113½	160⅛	97	80	1,990	6% conv. pfd.	100	25,000	6.00	120.08	156.73
48¾	49½	23⅜	28⅜	15⅝	20	3¾	43,100	488,600	Glidden Co.	No	603,304	2.00	.....	1.54
107	111	104⅞	107½	83	91½	48	490	10,780	Glidden, 7% pfd.	100	63,044	7.00	.....	22.60
120	119½	85	96⅞	74	85⅞	65	4,100	58,600	Hazel Atlas	25	434,409	5.00	5.21	6.22
87	90	71	81⅝	59	68⅝	15	3,700	65,200	Hercules Powder	No	582,679	3.50	3.94	2.79
130	131	122	125¾	111	110⅛	85	1,450	7,910	7% cum. pfd.	100	105,765	7.00	28.79	22.38
29⅞	36⅜	23½	32	19⅜	85	24	37,700	604,000	Industrial Rayon	No	600,000	1.68	2.23	3.01
4⅛	5	2⅝	6⅛	2	5⅞	⅞	38,600	183,700	Intern. Agricul.	No	436,049	None	p—.99	p .69
37	42¾	26	37¼	15	23½	5	14,200	67,000	7% cum. pr. pfd.	100	100,000	None	p2.69	p4.00
45½	47¼	22¼	29¼	21	23¼	6¾	569,200	2,828,600	Intern. Nickel	No	14,584,025	1.00	1.14	.53
25⅞	36¼	25	32	21	27¾	13¾	6,200	38,300	Intern. Salt	No	240,000	1.50	2.02	2.04
33½	36¼	31	33⅛	15¾	22	7½	2,900	66,700	Kellogg (Spencer)	No	500,000	1.60	v2.22	v3.01
47	49¼	21½	43⅞	22½	37⅜	4⅜	38,500	918,500	Libbey Owens Ford	No	2,559,042	1.20	1.25	1.64
37½	37¼	24½	35⅜	16⅛	50	10¼	38,000	277,400	Liquid Carbonic	No	342,406	1.25	v2.58	v1.05
30¼	33⅞	23¾	40¾	23½	46⅝	14	18,200	313,200	Mathieson Alkali	No	650,436	1.50	1.20	1.70
89	94¾	55	61⅝	39	83	25	20,800	230,300	Monsanto Chem.	10	864,000	1.25	3.03	2.57
206	206	145	170	135	140	43¼	1,500	21,900	National Lead	100	309,831	5.00	8.38	6.98
160	162½	150	146½	122	128¼	101	1,000	6,400	7% cum. "A" pfd.	100	243,676	7.00	20.12	18.35
138	140½	121⅝	121½	100½	109⅛	75	340	4,170	6% cum. "B" pfd.	100	103,277	6.00	35.36	30.45
10¼	10⅞	4⅜	13	5½	11¾	1⅜	114,200	451,100	Newport Industries	1	519,347	None	.31	.05
128	129	80	94	60	96¾	31½	21,300	223,000	Owens-Illinois Glass	25	1,200,000	4.00	5.41	4.86
48¼	53¾	42⅜	44⅜	33⅛	47½	19⅝	35,900	369,200	Procter & Gamble	No	6,410,000	1.70	p 2.23	p 2.11
120	121	115	117	102½	110¾	97	330	8,330	5% pfd. (ser. 2-1-29)	100	171,569	5.00	p88.13	p83.69
8½	8¾	4	6¾	3⅛	7¼	1⅜	79,000	323,800	Tenn. Corp.	5	857,896	None	.27	— .11
33¼	36¾	28¾	43¼	30	45¼	15¼	67,000	629,800	Texas Gulf Sulphur	No	2,540,000	2.00	1.81	2.93
71¾	75¾	44	50⅞	35⅞	51⅞	19¾	108,000	1,259,500	Union Carbide & Carbon	No	9,000,743	2.00	2.28	1.59
69⅝	78	46	50⅜	35	37¾	10¼	10,400	237,300	United Carbon	No	370,127	2.40	3.55	1.39
43	50⅝	35⅛	64¾	32	94	13½	31,000	402,400	U. S. Indus. Alco.	No	391,033	2.00	4.04	3.56
20½	21¾	11¼	31¾	14	36¼	7⅝	19,400	491,800	Vanadium Corp.-Amer.	No	366,637	None	—2.29	—2.40
4¾	4⅝	2½	5⅜	1⅞	7⅜	⅝	18,300	186,400	Virginia-Caro. Chem.	No	486,000	None	p—.79	p—2.46
36	35¾	17½	26	10	26½	3⅜	45,800	328,900	6% cum. part. pfd.	100	213,392	None	p4.20	p .52
115	120½	85	84	59¾	63½	35⅜	700	12,500	7% cum. prior pfd.	100	60,000	8.00	p23.50	p9.06
22⅝	25½	16¾	27¼	14⅞	20½	5	6,000	122,400	Westvaco Chlorine	No	284,962	.40	1.55	1.08
NEW YORK CURB EXCHANGE														
29½	30	15	22½	14⅝	16½	3¼	65,200	890,400	Amer. Cyanamid "B"	No	2,404,194	.60	.99	.99
3⅜	4	2	4⅛	2⅜	4½	1	1,500	15,400	British Celanese Am. R.	10	2,806,000	None	.....	.....
110	115	90	105¼	81	110	27	600	24,900	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	16.37	32.24
109	111¼	97½	102	83	90	51	1,575	11,175	7% cum. prior pfd.	100	213,668	7.00	28.13	47.98
10	15	7	19	7	26⅞	2	800	15,800	Celluloid Corp.	15	194,952	None	—1.67	—1.00
14⅛	14½	11⅝	14⅜	10½	11⅝	4⅛	800	10,300	Courtaulds' Ltd.	1 £	24,000,000	7½%	7.57%	8.98%
97	105½	80½	91	67½	78	30	8,000	83,200	Dow Chemical	No	945,000	2.00	3.32	†3.60
10¼	12½	6¼	10¾	4	8	½	4,000	117,800	Duval Texas Sulphur	No	500,000	None	z .25	z .08
52½	58	37	40¾	19	19	8	1,400	21,000	Heyden Chem. Corp.	10	147,600	1.50	3.07	2.74
90⅞	97¼	46¾	57½	39	39⅞	13	8,000	86,790	Pittsburgh Plate Glass	25	2,141,305	2.90	2.69	1.87
125½	128⅞	84	90½	47¼	47	12⅞	14,600	114,000	Sherwin Williams	25	635,583	4.00	y6.19	y5.31
109	113½	106	109¾	100	99	80	1,480	7,890	6% pfd. AA. cum.	100	155,521	6.00	y33.17	y28.44
PHILADELPHIA STOCK EXCHANGE														
116¾	116¾	76½	75	50¼	57	25¼	400	6,769	Pennsylvania Salt	50	150,000	4.00	p6.82	p4.10

1935 December Last	1935 December High	1935 December Low	1934 High	1934 Low	1933 High	1933 Low	Sales December	Sales 1935	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
112½	116	104½	106¾	83⅞	89	64	475,000	5,745,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
24¾	29¾	7⅜	17¾	5	14⅛	2⅛	217,000	3,615,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
92	94½	77⅜	88	61½	74⅞	37	77,000	802,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
99⅞	100¼	91⅛	92	62	65	38½	72,000	1,767,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
21⅜	21½	7	19½	5⅛	14⅞	2½	1,150,000	14,168,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
71	94	65	98½	89⅞	99⅛	87	50,000	1,018,000	Montecatini Min & Agric. det. 7's with war.	1937	7	J. J.	7,075,045
32½	38	32⅛	74½	34½	62	33¾	7,000	56,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
103⅞	104	91½	90	65½	76	50	42,000	628,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
87	94¼	66	89½	62	81	34¾	139,000	2,144,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000

† Years ended 5-31-34 and 35; *p* Years ended 9-30-34 and 35; *v* Years ended 8-1-34 and 35; *y* Years ended 8-31-34 and 35; *z* Years ended 8-31-34 and 35; * Including extras.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizers and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast, are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1934 Average $1.31 - Jan. 1935 $1.23 - Dec. 1935 $1.19

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Acetaldehyde, drs c-l, wks lb.	...	.14	...	.14	.14	.16½
Acetaldol, 95%, 50 gal drs wks ....lb.	.21	.25	.21	.25	.21	.31
Acetamide, tech, lcl, kegs..lb.	.38	.43	.38	.43	.40	1.35
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys ....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs ....lb.	.22	.24	.22	.24	.22	.32
Acetone, tks, delv ....lb.	.11	.12	.11	.12	.10	.12
drs, c-l, delv ....lb.	...	.12	...	.12	.12	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls ....lb.	.06¾	.07	.06¾	.07	.06	.07
Acetic, 28%, 400 lb bbls, c-l, wks ....100 lbs.	...	2.45	2.40	2.45	2.40	2.91
glacial, bbls, c-l, wks 100 lbs.	...	8.43	8.25	8.43	8.25	10.02
glacial, USP, bbls, c-l, wks ....100 lbs.	...	12.43	12.25	12.43	...	12.25
Adipic, kgs, bbls ....lb.	...	.72	...	.72	.72	.72
Anthranilic, refd, bbls ....lb.	.85	.95	.85	.95	.85	.95
tech, bbls ....lb.	...	.75	...	.75	.65	.75
Battery, cbys, delv ..100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs ..lb.	.40	.45	.40	.45	.40	.45
USP, 100 lb kgs ....lb.	.54	.59	.54	.59	...	...
Boric, tech, gran, 80 tons, bgs, delv ....ton *a*	...	95.00	80.00	95.00	80.00	80.00
Broenner's, bbls ....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys ....lb.	.53	.60	.53	.60	.53	.85
edible, c-l, wks, cbys ...lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs ....lb.	...	.22	...	.22	.22	.22
wks ....lb.	...	.23	...	.23	.23	.23
tks, wks ....lb.	...	.21	...	.21	.21	.21
Camphoric, drs ....lb.	...	5.25	...	5.25	5.25	5.25
Chicago, bbls. ....lb.	...	2.10	...	2.10	2.10	2.10
Chlorosulfonic, 1500 lb drs, wks ....lb.	.03½	.05	.03½	.05½	.04½	.05½
Chromic, 99¾%, drs, delv lb.	.14¾	.16¾	.13¾	.16¾	.13½	.15¾
Citric, USP, crys, 230 lb bbls ....lb. *b*	.28	.29	.28	.29	.28	.30
anhyd, gran, drs ....lb. *b*	...	.31	...	.31	.31	.31
Cleve's, 250 lb bbls ....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal ..gal.	.51	.53	.46	.53	.46	.47
99%, straw, LB, drs, wks, frt equal ....gal.	.68	.70	.64	.68	.64	.65
resin grade, drs, wks, frt equal ....gal.	.52	.53	.52	.55	.54	.55
Crotonic, drs ....lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs ..lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls ....lb.	...	.60	...	.60	...	...
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb. drs. ....lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls ....lb.	.65	.68	.65	.68	.60	.70
USP, bbls ....lb.	.70	.80	.70	.80	.74	.80
Gamma, 225 lb bbls, wks...lb.	.80	.84	.77	.79	.77	.79
H, 225 lb. bbls, wks ....lb.	.50	.55	.50	.55	.50	.70
Hydriodic, USP, 10% sol. cbys ....lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks ....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks ....lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks ....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks ....lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb bbls ....lb.	.04½	.05	.04½	.05	.04	.05
22%, light refd, bbls ..lb.	.06½	.07	.06½	.07	.06½	.07
44%, light, 500 lb bbls ..lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls ..lb.	.09½	.10	.09½	.10	.09	.10
50%, water white, 500 lb bbls ....lb.	...	.14½	...	...	...	...
USP X, 85%, cbys ....lb.	.45	.50	.45	.50	...	...
Laurent's, 250 lb bbls ....lb.	.46	.47	.36	.37	.36	.37
Linoleic, bbls ....lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs ....lb.	.29	.32	.29	.32	.25	.32
Malic, powd, kgs ....lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks ....N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.01
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls ....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks ....100 lb.	...	1.35	...	1.35	...	1.35
tks, wks ....100 lb.	...	1.00	...	1.00	...	1.00

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Muriatic (cont.):						
20°, cbys, c-l, wks ..100 lb.	...	1.45	...	1.45	...	1.45
tks, wks ....100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks ..100 lb.	...	1.95	...	1.95	...	1.95
tks, wks ....100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys ....lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls ....lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s. v., drs ....lb.	.11	.14	.11	.14	.10	.13
Sludges, drs ....lb.	.06	.10	...	...	...	...
Naphthionic, tech, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys. c-l, wks ....100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks..100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks..100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks..100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv ....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. ....lb.	.11½	.12½	.11½	.12½	.11½	.12½
Phosphoric, 50%, USP, cbys ....lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks..lb.	.06	.08	.06	.08	.05	.08
75%, acid, c-l, drs, wks..lb.	.09	.10½	.09	.10½	.07	.10½
Picramic, 300 lb bbls, wks.lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks ....lb.	.30	.40	.30	.40	.30	.50
Propionic, 98% wks, drs..lb.	...	.35	...	.35	...	...
80% ....lb.	.15	.17½	.15	.17½	...	...
Pyrogallic, crys, kgs, wks..lb.	1.55	1.65	1.55	1.65	1.40	1.65
Salicylic, tech, 125 lb bbls, wks ....lb.	...	.40	...	.40	.33	.40
Sebacic, tech, drs, wks ....lb.	...	.58	...	.58	...	.58
Succinc, bbls ....lb.	...	.75	...	.75	...	...
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.18	.19
Sulfuric, 60°, tks, wks ...ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks ....100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks ....ton	...	15.50	...	15.50	15.00	15.50
c-l, cbys, wks ....100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks ....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ....ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd, 300 lb bbls ....lb.	...	.24	.24	.25	.25	.26
Tobias, 250 lb bbls ....lb.	.70	.72½	.70	.80	.75	.80
Trichloroacetic bottles....lb.	2.45	2.75	2.45	2.75	2.00	2.75
kgs ....lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls ....lb.	1.50	1.60	1.50	1.60	1.35	1.70
Vanadic, drs, wks ....lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls ....lb.	.50	.60	.45	.60	.35	.53
dark, bbls ....lb.	.12	.17	.12	.17	.10	.17
egg, edible ....lb.	...	1.05	.85	1.05	.82	.92
vegetable, edible ....lb.	.65	.70	.65	.70	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.143	...	...	...	...
c-l, drs, delv ....lb.	...	.150	...	...	...	...
lcl, drs, delv ....lb.	...	.157	...	...	...	...
Amyl, secondary, tks, delv ....lb.	...	.108	...	.108	...	.108
Benzyl, bottles ....lb.	.65	1.10	.65	1.10	.75	1.10
Butyl, normal, tks, delv .lb. *d*	...	.11	.11	.12	.09½	.12
c-l, drs, delv ....lb. *d*	...	.12	.12	.13	.10½	.13
Butyl, secondary, tks, delv ....lb. *d*	...	.096	...	.096	.076	.096
c-l, drs, delv ....lb. *d*	...	.106	...	.106	.086	1.06
Capryl, drs, tech, wks ..lb.	...	.85	...	.85	.85	.85
Cinnamic, bottles ....lb.	3.25	3.65	3.25	3.65	3.25	3.65
Denatured, No. 5, c-l, drs, wks ....gal. *e*	...	.44	.34	.49	.30	.34
Western schedule, c-l, wks ....gal. *e*	...	.52	.38	.52	...	...
Denatured, No. 1, tks, wks ....gal. *e*	...	.31	.29½	.31	.29½	.304
c-l, drs, wks ....gal. *e*	...	.36	.34½	.36	...	...
Western schedule, tks, wks ....gal. *e*	...	.35	.32½	.35	...	...
c-l, drs, wks ....gal. *e*	...	.40	.37½	.40	...	...
Diacetone, tech, tks, delv ....lb. *f*	...	.16	...	.16	...	...
c-l, drs, delv ....lb. *f*	...	.17	...	.17	...	.17

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers are given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices Current

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Alcohols (continued)						
Ethyl, 190 proof, molasses,						
tks ....gal. g	...	4.10	4.08½	4.10	...	4.08½
c-l, drs ....gal. g	4.17	4.27	4.13½	4.27	...	4.13½
c-l, bbls ....gal. g	4.18	4.28	4.15½	4.28	4.12½	4.24½
absolute, drs ....gal. g	4.57½	6.11½	4.55½	6.11½	...	...
Furfuryl, tech, 500 lb,						
drs ....lb.	...	.35	...	.35	.35	.40
Hexyl, secondary tks, delv lb.	...	.11½	...	.11½	...	.11½
c-l, drs, delv ....lb.	...	.12½	...	.12½	...	.12½
Normal, drs, wks ....lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	4.00	4.50	4.00	4.50	4.00	4.50
Isobutyl, refd, lcl, drs ..lb.	...	.12	.12	.60	.60	.75
c-l, drs ....lb.	...	.11½	...	...	...	...
tks ....lb.	...	.10½	...	...	...	...
Isopropyl, refd, c-l, drs..lb.	...	.55	...	.55	.45	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.32	...	...	...	...
Western points, tks,						
wks ....gal.	...	.35	...	...	...	...
Aldehyde ammonia, 100 gal						
drs ....lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb						
bbls ....lb.	.60	.65	.60	.65	.65	.70
Alphanaphthylamine, 350 lb						
bbls ....lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l,						
bbls, wks ....100 lb.	...	3.00	...	3.00	2.90	3.00
25 bbls or more,						
wks ....100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls,						
wks ....100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls, wks 100 lb.	...	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls ....100 lb.	7.00	7.25	7.00	7.25	6.50	7.25
Potash, lump, c-l, bbls,						
wks ....100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks 100 lb.	...	3.40	...	3.00	...	3.00
25 bbls or more, bbls,						
wks ....100 lb.	...	3.00	...	3.15	...	3.15
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks ....100 lb.	4.00	4.15	4.00	4.15	3.50	4.15
Aluminum metal, c-l						
NY ....100 lb.	19.00	20.00	19.00	23.30	20.00	24.30
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks ....lb.	.05	.08	.05	.08	.04	.08
Crystals, c-l, drs, wks ...lb.	.06½	.07	.06½	.07	.06½	.01
Solution, drs, wks ....lb.	.03	.03½	.03	.03½	.03	.03½
Hydrate, 96%, light, 90 lb.						
bbls, delv ....lb.	.13	.15	.13	.15	.13	.16½
heavy, bbls, wks ....lb.	.04	.04½	.04	.04½	.04	.04½
Oleate, drs ....lb.	...	.15¾	...	.15¾	...	.15¾
Palmitate, bbls ....lb.	.21	.22	.20	.22	.19	.21
Resinate, pp., bbls ....lb.	...	.15	...	.15	.12½	.15
Stearate, 100 lb bbls....lb.	.18	.20	.17	.20	.17	.18
Sulfate, com, c-l, bgs,						
wks ....100 lb.	...	1.35	...	1.35	1.35	1.35
c-l, bbls, wks ....100 lb.	...	1.55	...	1.55	1.55	1.55
Sulfate, iron-free, c-l, bgs,						
wks ....100 lb.	...	1.90	...	1.90	1.90	1.90
c-l, bbls, wks ....100 lb.	...	2.05	...	2.05	2.05	2.05
Aminoazobenzene, 110 lb						
kgs ....lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks..lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.15½	.21½	.15½	.21½	.15½	.21½
26°, 800 lb drs, delv ....lb.	.02½	.03	.02½	.03	.02½	.03
Aqua 26° tks NH ....cont.	...	.05	...	.05	...	.05
tk wagon ....lb.	...	.024	...	.024	...	...
Ammonium Acetate, kgs ..lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b.						
plant ....100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls...lb.	.15	.17	.15	.17	.15	.17
carbonate, tech, 500 lb						
bbls ....lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb						
bbls, wks ....100 lb	4.45	4.90	4.45	4.90	4.45	5.25
Gray, 250 lb bbls wks...lb.	5.00	5.75	5.00	5.75	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10	.11
Lactate, 500 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Linoleate ....lb.	.11	.12	.11	.12	.11	.12
Nitrate, tech, cks ....lb.	.04	.05	.04	.05	.03¾	.05
Oleate, drs ....lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd,						
bbls ....lb.	.26	.27	.26	.27	.26	.27
pure, cryst, bbls, kgs..lb.	.27	.28	.27	.28	.27	.28
Serchlorate, kgs ....lb.	...	.16	...	.16	.16	.16
Persulfate, 112 lb kgs ..lb.	.22½	.25	.22½	.25	.20	.25
Phosphate, dibasic tech,						
powd, 325 lb bbls ....lb.	.08	.10	.08	.10	.08	.11½
Sulfate, dom, f.o.b., bulk. ton	22.00	24.00	20.00	24.00	22.00	25.00
200 lb bgs ....ton	...	nom.	25.50	25.80	...	25.80
100 lb bgs ....lb.	...	nom.	26.00	26.50	...	26.50
Sulfocyanide, kgs ....lb.	...	.50	...	.50	...	.50
Amyl Acetate (from pentane)						
tks delv ....lb.	...	.13½	...	.13½	...	.13½
tech, drs, delv ....lb.	.142	.149	.142	.149	.142	.149
secondary, tks, delv ..lb.	...	.108	...	.108	.09	.108
c-l, drs, delv ....lb.	.118	.123	.118	.123	...	.123
Amyl Chloride, norm drs, wks lb.	.56	.68	.56	.68	.56	.68
Chloride, mixed, drs,						
wks ....lb.	.07	.077	.07	.077	.07	12.2
tks, wks ....lb.	...	.06	...	.06	.06	10.5
Mercaptan, drs, wks ....lb.	...	1.10	...	1.10	...	1.10

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.10	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine ....lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ....lb.	...	.75	...	.75	...	.75
40% ....lb.	...	.18	...	.18	...	.18
Anthraqumone, sublimed, 125						
lb bbls ....lb.	.50	.52	.50	.52	.45	.50
Antimony, metal slabs, ton						
lots ....lb.	...	.13¼	.12½	.16	.07	.14½
Needle, powd, bbls ....lb.	.12½	.13½	.09	.13½	.07	.09
Butter of, see Chloride.						
Chloride, soln cbys ....lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls ....lb.	.13	.13¾	.10¼	.13¾	.08	.11
Salt, 63% to 65%, tins..lb.	.22	.24	.22	.24	.22	.24
Sulfuret, golden, bbls ...lb.	.22	.23	.19	.23	.16	.23
Vermilion, bbls ....lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls ..lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls ....lb.	.18	.20	.18	.20	.18	.20
Triple, 600 lb bbls ....lb.	.18	.20	.18	.20	.18	.20
Arglos, 80%, casks ....lb.	.15	.16	.15	.16	.15	.16
Crude, 30%, casks ....lb.	.07	.08	.07	.08	.07	.09
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ....lb.	.08¾	.09¼	.08¾	.09¼	.08¾	.09¼
Arsenic, Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	.14	.15¾
White, 112 lb kgs ....lb.	.03½	.04½	.03½	.04½	.03½	.05
Metal ....lb.	.40	.42	.40	.42	.40	.45
Asbestine, c-l wks ....ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip,						
200 lb bgs, wks ....ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat (witherite) 90% gr,						
c-l, wks, bgs ....ton	42.00	45.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY lb.	.15½	.17½	.14	.17½	.14	.16
Chloride, 600 lb bbl wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.13
Hydrate, 500 lb bbls ....lb.	.05½	.06	.05½	.06	.04¾	.06
Nitrate, 700 lb cks ....lb.	...	.08¼	...	.08¼	...	.08¾
Barytes, floated, 350 lb bbls						
wks ....ton	23.65	31.15	23.00	31.15	23.00	30.50
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	5.00	10.00
Bentonite, c-l, No. 1, bgs,						
wks ....ton	...	16.50	16.50	18.00	...	...
No. 2 ....ton	...	11.00	11.00	12.50	...	...
Benzaldehyde, tech, 945 lb						
drs, wks ....lb.	.60	.62	.60	.62	.60	.65
Benzene (Benzol), 90%, Ind,						
8000 gal tks, frt allowed						
....gal.	...	.18	.15	.18	.15	.20½
90% c-l, drs ....gal.	...	.23	.23	.24	...	.24
Ind Pure, tks, frt allowed						
....gal.	...	.18	.15	.18	.15	.20½
Benzidine Base, dry, 250 lb						
bbls ....lb.	.72	.74	.67	.69	.67	.69
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs..lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl,						
wks ....lb.	.24	.27	...	.24	...	.24
Naphthylamine, sublimed,						
200 lb bbls ....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.53	.55	.53	.55	.53	.58
Bismuth metal	1.00	1.10	.90	1.20	1.10	1.30
Chloride, boxes ....lb.	3.20	3.25	3.20	3.25	...	...
Hydroxide, boxes ....lb.	3.15	3.20	3.15	3.20	...	...
Oxychloride, boxes ....lb.	2.95	3.00	2.95	3.00	...	...
Subbenzoate, boxes ....lb.	3.25	3.30	3.25	3.30	...	...
Subcarbonate, kgs ....lb.	1.40	1.45	1.55	1.70	...	...
Trioxide, powd, boxes ..lb.	3.45	3.50	3.45	3.50	...	...
Subnitrate	1.30	1.35	1.30	1.45	1.40	1.60
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls,						
wks ....ton h	42.50	70.00	42.50	70.00	42.50	70.00
Bleaching Powder, 800 lb drs						
c-l wks contract...100 lb.	...	2.00	1.90	2.00	...	1.90
lcl, drs, wks ....lb.	2.25	3.60	2.15	3.60	2.00	3.50
Blood, dried, f.o.b., NY..unit	...	3.00	2.50	3.25	2.40	3.25
Chicago, high grade ...unit	...	3.35	2.50	3.75	2.00	3.10
Imported shipt ....unit	2.95	3.07½	2.75	3.30	2.75	3.20
Blues, Bronze Chinese Milori						
Prussian Soluble ....lb.	.37	.38½	.36½	.38	.35½	.38
Ultramarine,* dry, wks,						
bbls ....lb.	...	.10	...	...	...	...
Regular grade, group 1 lb.	...	.15	...	...	...	...
Special, group 1....lb.	...	.18	...	...	...	...
Pulp, No. 1 ....lb.	...	.26	...	...	...	...
Bone, 4½ + 50% raw,						
Chicago ....ton	20.00	22.00	19.00	22.00	19.00	25.00
Bone Ash, 100 lb kgs ....lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ....lb.	.05½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp..ton	...	23.00	22.75	24.00	16.00	24.00
Domestic, bgs, Chicago..ton	19.00	20.00	16.00	21.00	...	...
Borax, tech, gran, 80 ton lots,						
sacks, delv ....ton i	...	40.00	36.00	40.00	36.00	36.00
bbls, delv ....ton i	...	50.00	46.00	50.00	46.00	46.00
c-l, sacks, delv ....ton i	...	44.00	40.00	44.00	40.00	40.00
c-l, bbls, delv ....ton i	...	54.00	50.00	54.00	50.00	50.00
Tech, powd, 80 ton lots,						
sacks ....ton i	...	45.00	41.00	45.00	41.00	41.00
bbls, delv ....ton i	...	56.00	51.00	56.00	51.00	51.00
c-l, sacks, delv ....ton i	...	49.00	45.00	49.00	45.00	45.00
c-l, bbls, delv ....ton i	...	59.00	55.00	59.00	55.00	55.00
Bordeaux Mixture, jobbers,						
East, c-l, tins, drs, cases lb.	.08	.16	.08	.16	...	.16
Jobbers, West, c-l ....lb.	.08	.10	.08	.10	...	.10
Dealers, East, c-l ....lb.	.08½	.16½	.08½	.16½	...	.16½
Dealers, West, c-l ....lb.	.09	.11	.09	.11	...	.11

h Lowest price is for pulp, highest for high grade precipitated; i Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

Prices

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Bromine, cases ....lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk ....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks ....lb.	...	.04	...	.04	.02¾	.04
Butyl, Acetate, norm drs, frt allowed ....lb.	.12	.12½	.12	.13½	.11	.14
tks, frt allowed ....lb.	...	.11	.11	.13	.10	.13
Secondary tks, frt allowed lb.	..	.096	...	.096	.08	.096
drs, frt, allowed ......lb.	.106	.111	.106	.111	...	.111
Aldehyde, 50 gal drs wks lbs.	.19	.21	.19	.21	.19	.36
Secondary, drs ....lb.	.60	.75	.60	.75	.60	.75
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Lactate drs ....lb.	.22½	.23½	.22½	.23½	.22½	.29
Propionate, drs ....lb.	.18	.18½	.18	.18½	.17	.22
tks, delv ....lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ....lb.	...	.26	...	.26	.25	.26
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes...lb.	...	.90	.75	.85	.65	.85
Cadmium Metal ....lb.	.85	.90	.55	.90	.55	.65
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	2.10	2.00	2.10	2.00	3.00
Arsenate, jobbers, East of Rocky Mts, drs ......lb.	.06	.06⅜	.06	.06½	...	...
dealers, drs ....lb.	.06¼	.07¾	.06¼	.07¾	...	...
South, jobbers, drs .....lb.	.06	.06½	.06	.06½	...	...
dealers, drs ....lb.	.06½	.06¾	.06¼	.06¾	...	...
Carbide, drs ....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l ....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs c-l wks ....ton	...	19.50	...	19.50	...	19.50
Solid, 650 lb drs c-l f.o.b. wks ....ton	...	17.50	...	17.50	...	17.50
Ferrocyanide, 350 lb bbls wks ....lb.	...	.17	...	.17	...	.17
Gluconate, tech, 125 lb bbls ....lb.	...	.28	...	.28	.25	.28
Nitrate, 100 lb bgs ....ton	...	26.50	...	26.50	...	26.50
Palmitate, bbls ....lb.	.21	.22	.20	.22	.19	.20
Peroxide, 100 lb drs ....lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls ....lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls....lb.	.18	.20	.17	.20	.17	.19
Camphor, slabs ....lb.	.56	.57	.49	.57	.51	.59
Powder ....lb.	.56	.57	.50	.57	.51	.59
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l ....lb.	.08	.15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones lb.	...	.07	...	.07	.06½	.07
cartons, delv ....lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv ....lb.	...	.08¼	...	.08¼	...	.08¼
Bisulfide, 500 lb drs....lb.	.05¼	.08	.05¼	.08	.05½	.08
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv ....lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom grd lb.	.15	.16¾	.09½	.16¾	.09¼	.13
80-100 mesh, c-l, bgs ....lb.	.15½	.17¼	.10	.17¼	.10	.14
Castor Pomace, 5½ NH_3, cl, bgs, wks ....ton	...	16.00	16.00	18.50	...	...
Imported, ship, bgs ....ton	...	17.50	17.25	20.00	...	...
Celluloid, Scraps, ivory cs lb.	.17	.18	.17	.18	.13	.18
Transparent, cs ....lb.	...	.20	...	.20	.16	.20
Cellulose, Acetate, 50 lb kgs ....lb.	.55	.60	.55	.60	.55	.90
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks ....lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	.12	.18
Willow, powd, 100 lb bbl wks ....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bgs, delv* ....ton	24.40	25.40	22.40	30.00	...	...
Chestnut, clarified bbls wks lb.	...	.01⅞	...	.01⅞	.01⅝	.01⅞
25% tks wks ....lb	...	.01½	...	.01½	.01¼	.01½
Pwd, 60%, 100 lb bgs, wks ....lb.	..	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	7.00	9.00
Powdered, bbls ....lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks ...ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ...ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks contract ....lb.	.07½	.08½	.07½	.08½	.07	.08½
cyls, c-l, contract ... lb. *j*	...	.05½	.	.05½	...	.05½
Liq tk wks contract..100 lb.	...	2.15	2.00	2.15	1.85	2.00
Multi c-l cyls wks cont..lb.	2.30	2.55	2.30	2.40	2.00	2.40
Chloroacetophenone, tins, wks ....lb.	...	2.00	...	2.00	...	...
Chlorobenzene, Mono, 100 lb drs, lc-l, wks ....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs ....lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins ....lb.	.30	.31	.30	.31	.30	.35
Chloropicrin; comml cyls..lb.	.85	.90	.85	.90	.85	1.25
Chrome, Green, CP ......lb.	.17	.18½	.17	.30	.20	.30
Yellow ....lb.	.11	.12	.11	.16	.15	.16
Chromium, Acetate, 8% Chrome bbls ....lb.	.05	.05¾	.05	.05¾	.05	.05¾
20° soln, 400 lb bbls .. lb.	.	.05½	..	.05½		.05½
Fluoride, powd, 400 lb bbl .. .. lb.	.27	.28	.27	.28	27	28

j A delivered price; * Depends upon point of delivery.

Current

Coal Tar
Diphenylguanidine

	Current	Market	1935 Low	1935 High	1934 Low	1934 High
Coal tar, bbls ....bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls ......lb.	..	.60	...	.60	.60	.80
Carbonate tech, bbls ....lb.	1.35	1.40	1.35	1.40	1.34	1.40
Hydrate, bbls ....lb.	1.66	1.76	1.66	1.76	1.66	1.76
Linoleate, paste, bbls ...lb.	...	.30	...	.30	.30	.40
Resinate, fused, bbls ...lb.	...	.12½	...	.12½	...	.12½
Precipitated, bbls ....lb.	...	.32	...	.32	.32	.42
Cobalt Oxide, black, bgs ..lb.	1.39	1.49	1.25	1.49	1.25	1.35
Cochineal, gray or bk bgs lb.	.32	.36	.32	.39	.33	.42
Teneriffe silver, bgs .. .lb.	.33	.37	.33	.40	.34	.43
Copper, metal, electrol 100 lb.	...	9.25	8.00	9.25	7.87½	9.00
Carbonate, 400 lb bbls ..lb.	...	.08¼	...	.08¼	...	.08¼
52-54% bbls ....lb.	.14½	.16¼	.14½	.16¼	.15½	.16
Chloride, 250 lb bbls .. lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.38	.37	.40
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	.20
Oxide, red, 100 lb bbls ..lb.	.15	.17	.15	.17	.12½	.17
black bbls, wks ......lb.	.14½	.15	.14	.16½	...	..
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	.18	.19
Stearate, precip, bbls .. lb.	.35	.40	.35	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	3.85	...	3.85	3.75	3.85
Copperas, crys and sugar bulk c-l, wks, bgs ....ton	13.00	14.00	12.00	14.00	12.00	14.50
Corn Syrup, 42 deg, bbls ....100 lb.	...	3.18	3.18	3.63	3.04	3.59
43 deg, bbls ......100 lb.	...	3.23	3.23	3.68	3.09	3.64
Corn Sugar, tanners, bbls ....100 lbs.	...	3.56	3.46	3.66	...	...
Cotton, Soluble, wet, 100 lb bbls .. .. lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	..	.16¾	.16¼	.17¼	.17½	.19½
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ......gal.	.12½	.13½	.11½	.13½	.10	.12½
Grade 2 ....gal.	.109	.12	.10½	.12	.10½	.12
Cresol, USP, drs ....lb.	.10	.10½	.10	.11½	.11	.11½
Crotonaldehyde, 98% 50 gal drs ....lb.	.26	.30	.32	.36	.26	.36
Cudbear, English .. ..lb.	.19	.25	.19	.25	.19	.25
Cutch, Philippine, 100 lb bale ....lb.	.04	.04¾	.03½	.04¾	.03½	.04¾
Cyanamid, bags c-l frt allowed Ammonia unit	...	1.07½	...	1.07½	...	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	3.60	3.70	3.60	4.15	3.50	4.20
British Gum, bgs ...100 lb.	3.85	3.95	3.85	4.50	3.75	4.60
White, 140 lb bgs ..100 lb.	3.55	3.60	3.50	4.10	3.47	4.20
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl ...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.08	.08	.08¾	.06¾	.08¾
Diamylamine, drs, wks ....lb.	...	1.00	..	1.00	...	1.00
Diamylene, drs, wks ......lb.	.095	.102	.095	.102	.09	.102
tks, wks ....lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.09	.77
tks, wks ....lb.	..	.075	...	.075	...	...
Diamylphthalate, drs wks gal.	.18	.19½	.18	.20½	...	.20½
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	..	1.10
Dianisidine, bbls ....lb.	2.25	2.45	2.25	2.45	2.35	2.45
Dibutylphthalate, drs, wks lb.	.20	.21	.20	.23	.20½	.21
Dibutyltartrate, 50 gal drs lb.	.35	.40	.35	.40	.35	.40
Dichlorethylene, drs .....gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks ....lb.	.16	.17	.16	.17	.16	.21
tks, wks ....lb.	...	.15	...	.15	...	.15
Dichloromethane, drs, wks lb.	...	.23	.15	.23	...	.15
Dichloropentanes, drs, wks lb.	.032	.040	.032	.040	.0278	.040
tks, wks .. ..lb.	...	.02½	...	.02½	...	.02½
Diethanolamine, tks ......lb.	...	.30	...	...	...	...
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅛	.35	.31⅛	.35	.31⅛	.35
90% grade, drs ......lb.	...	.25	...	.25	..	.25
Diethylaniline, 850 lb drs..lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs ....lb.	.18½	.19	.18½	.27	.26	.27
Diethylsulfate, tech, 50 gal drs .. ..lb.	...	...	...	...	..	...
Diethyleneglycol, drs .....lb.	.15½	.17½	.15½	.17½	.14	.16
Mono ethyl ethers, drs..lb.	.15	.17	.15	.17	.15	.17
tks, wks ....lb.	...	.15	...	.15	...	...
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs wks ....lb.	.20	.24	.20	.27	.26	.27
Diglycol Oleate, bbls .....lb.	.16	.24	.16	.24	.16	.18
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .. .. lb.	..	.95	...	.95	.95	1.20
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.29	.30
Dimethyl Ethyl Carbinol, drs .... lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs ...lb.	.20	.21½	.20½	.24½	.24	.24½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls ....lb. *k*	.17	.19½	.17	.19½	.17	.19½
Dintrochlorobenzene, 400 lb bbls .. ..lb.	.14	.15½	.14	.15½	.14	.15½
Dinitronaphthalene, 350 lb bbls ....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.15½	.16½	.15½	.16½	.15½	.16½
Diphenyl ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.31	.34
Diphenylguanidine, 100 lb bbl ....lb.	.36	.37	.36	.37	.36	.37

k Higher price is for purified material.

	Current Market		1935		1934	
			Low	High	Low	High
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt. ton	36.00	40.00	36.00	40.00	35.00	40.00
Extract ....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, dom., 200 lb cases ....lb.	...	.63	.46	.63	.40	.54
Imported ....lb.	.54	.56	...	...	...	...
Epsom Salt, tech, 300 lb bbls c-l NY ....100 lb.	1.80	2.00	1.80	2.25	2.20	2.25
USP, c-l, bbls .....100 lb.	...	2.00	2.00	2.25	2.25	2.25
Ether, USP anaesthesia 55 lb drs ....lb.	.22	.23	.22	.23	.22	.24
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ......lb.	...	.06	...	.06	...	...
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks ....lb.	.07½	.08	.07½	.08	.07½	.08
drs ....lb.	.08½	.09	.08½	.09	.08½	.09
Anhydrous, tks ....lb.	...	.08½	...	.08½	.08½	.10
drs ....lb.	.09½	.10	.09½	.10	.09½	.10¼
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys ...lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs ....lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks ......lb.	.25	.29	.25	.29	.25	.33
Methyl Ketone, 50 gal drs, frt allowed ....lb.	.08½	.09	.08½	.09	.08½	.09
tks, frt allowed ......lb.	...	.07½	...	.07½	...	...
Oxalate, drs, wks ......lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	...	...	...
Dichloride, 50 gal drs ..lb.	.0545	.0994	.0545	.0994	.0545	.09
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.28	.26	.28
tks, wks ....lb.	...	.16	...	...	...	...
Mono Butyl Ether, drs, wks	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	.19	.19
Mono Ethyl Ether, drs, wks	.16	.17	.16	.17	.15	.17
tks, wks ....lb	...	.15	...	.15	.15	.15
Mono Ethyl Ether Acetate, drs, wks	.17½	.18½	.17½	.18½	.16½	.18½
tks, wks ....lb.	...	.16½	...	.16½	.16½	.16½
Mono, Methyl Ether, drs wks ....lb.	.19	.23	.19	.23	.21	.23
tks, wks ....lb.	...	.18	...	...	...	...
Stearate	.18	.18	.18	.18	.18	.18
Oxide, cyl ....lb.	.55	.60	.55	.75	...	.75
Ethylidenaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery .....ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks ....ton	14.00	14.50	14.00	14.50	13.50	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	...	...
Fish Scrap, dried, unground, wks ....unit *l*	...	nom.	2.25	2.90	2.25	2.60
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	nom.	2.00	2.35	2.00	2.50
Fluorspar, 98%, bgs	30.00	35.50	28.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ....ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs .....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, chips ....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes ..lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes ......lb.	.16	.18	.16	.18	.16	.18
Sticks ....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls ..lb.	.45	.47	.42	.43	.42	.43
Gall Extract ....lb.	.18	.20	.18	.20	.18	.20
Gambier, com 200 lb bgs ..lb.	...	.06	.05	.08	.04	.08
Singapore cubes, 150 lb bgs ....100 lb.	.08	.09	.07⅛	.09⅛	.05	.09⅛
Gelatin, tech, 100 lb cs ...lb.	.50	.55	.50	.55	.45	.55
Glauber's Salt, tech, c-l wks ....100 lb.	1.10	1.30	1.10	1.30	1.10	1.30
Anhydrous, see Sodium Sulfate.						
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb. bgs ....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l bgs ....lb.	.10½	.17½	...	...	...	...
Better grades, c-l, bgs lb.	.12	.17½	...	...	...	...
Casein, kgs ....lb.	.18	.22	.18	.22	.18	.22
Glycerin, CP, 550 lb drs ..lb.	.14	.14½	.14	.14½	.11	.14½
Dynamite, 100 lb drs ...lb.	.13¾	.14¼	.13¾	.14¼	.10	.14¼
Saponification, drs .....lb.	.10¼	.11½	.10	.11½	.06¾	.10½
Soap Lye, drs ....lb.	.09¼	.09½	.09	.10	.06¼	.09½

l + 10; *m* + 50.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Glyceryl Phthalate ....lb.	...	.28	...	.28	...	.28
Glyceryl Stearate, bbls....lb.	...	.18	...	.18	...	.18
Glycol Phthallate ....lb.	...	.29	.28	.29	...	.28
Glycol Stearate ....lb.	...	.23	.18	.23	.18	.20
Graphite,						
Crystalline, 500 lb bbls ....lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls ....lb.	.03	.04	.03	.04	.03	.04
GUMS						
Gum Aloes, Barbadoes ....lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts ......lb.	.10¼	.10¾	.09½	.15	.07¾	.10⅝
White sorts, No. 1, bgs ....lb.	.25	.27	.21	.27	...	...
No. 2, bgs ....lb.	.24	.26	.19	.26	...	...
Powd, bbls ....lb.	.13¼	.13¾	.13¼	.18	...	...
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY ....lb.	.02½	.10½	.02½	.10½	.02½	.10½
Egyptian, 200 lb cases, f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
California, f.o.b. NY, drs ....ton	29.00	55.00	29.00	55.00	...	...
Benzoin Sumatra, USP, 120 lb cases ....lb.	.18	.19	.19	.28	.18½	.23
Copal Congo, 112 lb bgs, clean, opaque ....lb.	.19½	.20	.19½	.24⅝	.24⅛	.28
Dark, amber ....lb.	.07½	.08	.07¼	.09¼	.08⅝	.10½
Light, amber ....lb.	.13⅝	.14⅛	.11½	.14⅞	.14⅜	.19
Copal, East India 180 lb bgs						
Macassar pale bold ....lb.	.10	.10½	.09½	.10¾	.09⅞	.10½
Chips ....lb.	.05½	.06	.05½	.06	...	...
Nubs ....lb.	.03⅝	.04¼	...	...	...	...
Dust ....lb.	.03⅝	.04⅛	.03⅝	.04½	...	...
Singapore						
Bold ....lb.	.16⅜	.16⅞	.12⅛	.17	.16	.17
Chips ....lb.	.04¾	.05¼	.04⅝	.05⅝	...	...
Nubs ....lb.	.10¾	.11¼	.10	.11¾	...	...
Dust ....lb.	.03⅝	.04⅛	.03⅝	.05½	...	...
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	.12½	.13	.11¾	.13	.11⅜	.14½
Loba B ....lb.	.10⅝	.11⅛	.10¼	.12	.10¼	.13½
Loba C ....lb.	.10⅝	.11⅛	.10⅛	.11½	.09¾	.12
MA sorts ....lb.	.07⅛	.07⅝	.06	.07⅝	.06½	.07½
DBB ....lb.	.08⅜	.08⅞	.08	.09	.08	.09½
Dust ....lb.	.05⅝	.06⅛	.04⅞	.06⅛	...	...
Copal Pontianak, 224 lb cases, bold genuine ....lb.	.15½	.16	.14⅜	.16⅝	.16⅛	.19
Mixed ....lb.	.13¼	.13¾	.12⅞	.14⅞	...	...
Chips ....lb.	.07	.07½	.06⅞	.08¼	...	...
Nubs ....lb.	.10¾	.11¼	.09⅝	.11¾	...	...
Split ....lb.	.13⅝	.13⅞	.12⅜	.13⅞	...	...
Dammar Batavia, 136 lb cases						
A ....lb.	.21⅜	.21⅞	.19	.21⅞	...	...
B ....lb.	.20⅜	.20⅞	.18	.20⅞	...	...
C ....lb.	.16½	.17	.16	.17	...	...
D ....lb.	.13⅝	.14⅛	.11¾	.14⅛	...	...
A/D ....lb.	.15⅛	.15⅝	.14	.16	...	...
A/E ....lb.	.13	.13¾	.11¾	.13¾	...	...
E ....lb.	.06¾	.07¼	.07	.07¼	.07	.09½
F ....lb.	.06⅜	.06⅞	.06⅛	.06⅞	.05½	.06⅝
Singapore						
No. 1 ....lb.	.17	.17½	.15⅝	.19	.15½	.18
No. 2 ....lb.	.13¾	.14¼	.10⅝	.14⅞	.09⅜	.11
No. 3 ....lb.	.05¼	.05¾	.04⅝	.05⅞	.05⅛	.07
Chips ....lb.	.09¾	.09¾	.08⅞	.09¾	.09	.10¼
Dust ....lb.	.05⅛	.05⅝	.04¾	.05⅞	.05	.06
Seeds ....lb.	.06⅝	.06¾	.04¾	.07¼	.06	.07¾
Ester ....lb.	.07⅝	.08⅜	.07¼	.08⅜	...	...
Elemi, cons ....lb.	.09¾	.10¼	...	...	...	...
Gamboge, pipe, cases ......lb.	.55	.56	.55	.65	.57	.65
Powdered, bbls ....lb.	.62	.70	.65	.75	.67	.75
Ghatti, sol. bgs ....lb.	.11	.15	.09	.15	.09	.09½
Karaya, pow bbls xxx ....lb.	.24	.25	.23	.25	.23	.25
xx ....lb.	.16	.17	.15	.17	.15	.16
No. 1 ....lb.	.09½	.10	.08	.10	.08	.11
No. 2 ....lb.	.08½	.09	.07	.09	.07	.09
Kauri, NY, San Francisco,						
Brown XXX, cases ....lb.	.60	.60½	.60	.60½	...	...
BX ....lb.	.33	.33½	.33	.33½	...	...
B1 ....lb.	.19	.19½	.19	.19½	...	...
B2 ....lb.	.14½	.15	.14½	.15	...	...
B3 ....lb.	.12	.12½	.12	.12½	...	...
Pale XXX ....lb.	.65	.65½	.65	.65½	...	...
No. 1 ....lb.	.40	.40½	.40	.40½	...	...
No. 2 ....lb.	.22	.22½	.22	.22½	...	...
No. 3 ....lb.	.15	.15½	.15	.15½	...	...
Kino, tins ....lb.	.70	.80	.70	.80	.75	.80
Mastic ....lb.	.60	.60½	.46	.60½	.35	.55½
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.26¼	.26½	.26¼	.35½	.35	.50
Senegal, picked bgs ......lb.	.20	.21	.20	.21	17	.21
Sorts ....lb.	.11½	.12½	.09⅜	.12½	.08	.10
Thus, bbls ....280 lbs.	...	11.00	10.50	11.00	9.50	10.75
Strained ....280 lbs.	...	11.00	10.50	11.00	9.50	10.75
Tragacanth, No. 1, cases ....lb.	1.20	1.25	1.15	1.30	1.00	1.20
No. 2 ....lb.	1.10	1.15	1.05	1.20	...	...
No. 3 ....lb.	.95	1.00	.95	1.05	...	...
No. 4 ....lb.	.85	.90	.85	.95	...	...
No. 5 ....lb.	.75	.80	.75	.85	...	...
No. 6, bgs ....lb.	.18	.19	.14	.19	...	...
Sorts, bgs ....lb.	...	.25	.11	.25	...	...
Yacca, bgs.................lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.04

Prices

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Helium, cyl. (200 cu. ft.) cyl.	...	25.00	...	25.00	25.00	25.00
Hematite crystals, 400 lb bbls ... lb.	.16	.18	.16	.18	.16	.18
Paste, 500 bbls ... lb.	...	.11	...	.11	...	.11
Hemlock 25%, 600 lb bbls wks ... lb.	...	.02⅞	...	.02⅞	.02⅞	.04½
tks ... lb.	...	.02½	...	.02½	...	...
Hexalene, 50 gal drs wks .. lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tks ... gal.	...	.14	...	.14	...	.14
Hexamethylenetetramine, drs ... lb.	.37	.39	.37	.39	.37	.39
Hexyl Acetate, delv drs ... lb.	.12	.12½	.12	.12½	.12	.12½
tks ... lb.	...	.11½	...	.11½	...	...
Hoof Meal, f.o.b. Chicago unit	...	2.50	2.50	2.70	1.85	2.70
South Amer. to arrive unit	...	1.85	...	1.85	1.65	1.80
Hydrogen Peroxide, 100 vol, 140 lb cbys ... lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride ... lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17	.20	.17	.20	.17	.20
Indigo Madras, bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drs ... lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid ... lb.	...	.12	...	.12	...	.12
Iodine, Resublimed, kgs .. lb.	1.65	1.75	...	1.90	1.90	2.30
Irish Moss, ord, bales ... lb.	.09	.10	.09	.10	.07	.10
Bleached, prime, bales .. lb.	.18	.19	.18	.19	.14	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls .. 100 lb.	2.75	3.25	2.75	3.25	2.75	3.25
Oxide, English ... lb.	.07½	.08¾	.07½	.08¾	.07½	.09
Isobutyl Carbinol (128-132°C) drs, wks ... lb.	.33	.34	.33	.34	.34	.34
tks, wks ... lb.	...	.32	...	.32	.32	.326
Isopropyl Acetate, tks ... lb.	...	.07½	...	.07½	.07	.07½
drs, frt allowed ... lb.	.08½	.09	.08½	.09	...	...
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ... ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls ... lb.	...	.09½	...	.09½	.09½	.09½
White, broken, bbls ... lb.	...	.11	...	.11	.11	.11
cryst bbls ... lb.	...	.10½	...	.10½	.10½	.10½
gran, bbls ... lb.	...	.11	...	.11	.11	.11
powd, bbls ... lb.	...	.11¼	...	.11¼	.11¼	.11¼
Arsenate, East, jobbers, drs ... lb.	.09	.09⅜	.09	.09½	...	...
Dealers, drs ... lb.	.09¼	.10¾	.09¼	.10¾	...	...
West, jobbers, drs ... lb.	...	.09	...	.09	...	...
dealers, drs ... lb.	...	.10	...	.10	...	...
Linoleate, solid bbls ... lb.	.26	.26½	.26	.26½	.26	.26½
Metal, c-l, NY ... 100 lb	...	4.50	3.50	4.50	3.50	4.25
Red, dry, 95% Pb_3O_4, delv ... lb.	.07	.08	.06	.08	.06	.07¾
97% Pb_3O_4, delv ... lb.	.07¼	.08¼	.06¼	.08¼	...	...
98% Pb_3O_4, delv ... lb.	.07½	.08½	.06½	.08½	...	...
Nitrate, 500 lb bbls, wks .. lb.	.10	.14	.10	.14	.10	.14
Oleate, bbls ... lb.	.15	.16	.15	.16	.15	.16
Resinate, precip, bbls ... lb.	...	.14	...	.14	.14	.18½
Stearate, bbls ... lb.	.22	.23	.22	.23	.22	.23
White, 500 lb bbls, wks .. lb.	.06½	.07	.06½	.07	.06½	.07
Sulfate, 500 lb bbls, wks lb.	...	.06	...	.06	...	.06
Lime, chemical quicklime, f.o.b., wks, bulk ... ton	7.00	7.25	7.00	7.25	...	...
Hydrated, f.o.b., wks .. ton	8.50	12.00	8.50	12.00	...	...
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks .. gal.	...	.11	.10½	.11	...	...
drs ... gal.	.13	.16	.13	.16½	...	...
Dry, bgs, jobbers ... lb.	.07¼	.10¼	...	...	...	...
Linseed Meal, bgs ... ton	...	30.00	25.50	40.00	30.50	41.00
Litharge, coml, delv, bbls .. lb.	.06	.07	.05	.07	.051	.06¾
Lithopone, dom, ordinary, delv, bgs ... lb.	.04½	.04¾	.04½	.04¾	.04½	.04¾
bbls ... lb.	.04¾	.05	.04¾	.05	.04¾	.05
High strength, bgs ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ... lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Titanated, bgs ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
bbls ... lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.10½	.08½	.12½
Solid, 50 lb boxes ... lb.	.13½	.17½	.13½	.17½	.13½	.17½
Sticks ... ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch ... lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	55.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks ... lb.	.06	.06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ... ton	36.00	39.00	36.00	39.00	34.00	39.00
Magnesium fluosilicate, crys, 400 lb bbls, wks ... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb. bbls ... lb.	...	.42	...	.42	...	.42
Heavy, 250 lb bbls ... lb.	...	.50	...	.50	...	.50
Palmitate, bbls ... lb.	.23	.24	.22	.24	.21	.23
Stearate, bbls ... lb.	.20	.22	.19	.22	...	...
Linoleate, liq drs ... lb.	.18	.19	.18	.19	.18	.19
Resinate, fused, bbls ... lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, bbls ... lb.	...	.12	...	.12	.11½	.12½
Manganese Borate, 30%, 200 lb bbls ... lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ... lb.	.09	.12	.09	.12	.07	.12
Dioxide, tech (peroxide), paper bgs, c-l ... ton	...	47.50	45.00	50.00	...	...
Mangrove 55%, 400 lb bbls lb.	..	.04	.	.04	...	.04
Bark, African ... ton	26.00	26.50	26.00	30.00	26.00	32.00
Marble Flour, blk ... ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride ... lb.	.76	.91	.71	.93	.73	.93

Current

Mercury — Orthodichlorobenzene

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Mercury metal . . . 76 lb. flasks	. . .	77.00	69.00	77.00	66.50	79.00
Meta-nitro-aniline . . . . lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200						
lb bbls . . . . lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300						
lb bbls . . . . lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs . . . . lb.	1.20	1.25	1.20	1.25	1.20	1.25
Silicofluoride, bbls . . . . . lb.	.09	.10	.09	.10	.09	.11
Stearate, bbls . . . . lb.	.19	.20	.19	.20	.19	.20
Meta-toluene-diamine, 300 lb						
bbls . . . . lb.	.67	.69	.67	.69	.67	.69
Methanol, 95%, frt allowed,						
drs . . . . gal. *o*	.37½	.58	.37½	.58	.37½	.58
tks, frt allowed . . . . gal. *o*	.33	.36½	.33	.36½	.33	.36½
97% frt allowed, drs gal. *o*	.38½	.59	.38½	.59	.38½	.59
tks, frt allowed . . . . gal. *o*	.34	.37½	.34	.37½	.34	.37½
Pure, frt allowed, drs gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed . . . . gal. *o*	.35½	.39	.35½	.39	.35½	.39
Synthetic, frt allowed,						
drs . . . . gal. *o*	.40	.61	.40	.61	.40	.61
tks, frt allowed . . . . gal. *o*	.35½	.39	.35½	.39	.35½	.39
Methyl Acetate, dom, 98-						
100%, drs . . . . lb.	.18	.18½	.18	.18½	.18	.18½
Synthetic, 410 lb drs . . . lb.	.16	.17	.16	.17	.16	.17
tks . . . . lb.	. . .	.15	. . .	.15	.15	.15
Acetone, frt allowed,						
drs . . . . gal. *p*	.49½	.68½	.49½	.73½	. . .	. . .
tks, frt allowed, drs gal. *p*	.44	. . .	.44	.52½	. . .	. . .
Synthetic, frt allowed, east						
of Rocky M., drs gal. *p*	.57½	.60	.57½	.60	.57½	.60
tks, frt allowed	. . .	.53	. . .	.53	. . .	. . .
West of Rocky M., frt						
allowed, drs . . . . gal. *p*	.60	.63	.60	.63	. . .	. . .
tks, frt allowed . . gal. *p*	. . .	.56	. . .	.56	. . .	. . .
Hexyl Ketone, pure, drs lb.	. . .	.60	. . .	.60	.60	1.20
Anthraquinone . . . . lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks . . . . . . lb.	. . .	.10½	. . .	.10½	.10½	.10½
Chloride, 90 lb cyl . . . . . lb.	. . .	.45	. . .	.45	.45	.45
Ethyl Ketone, tks . . . . . . lb.	. . .	.07½	. . .	.07½	.07½	.07½
Propyl carbinol, drs . . . lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks . . lb.	35.00	. . .	35.00	. . .	. . .	. . .
Michler's Ketone, kgs . . . . lb.	. . .	2.50	. . .	2.50	. . .	2.50
Molasses, blackstrap, tks,						
f.o.b. NY . . . . gal.	.08	.08¼	.07¾	.08¼	.06	.09
Monoamylamine, drs, wks lb.	. . .	1.00	. . .	1.00	. . .	1.00
Monochlorobenzene, see						
Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	. . .	.30	. . .	. . .	. . .	. . .
Monomethylparaminosulfate,						
100 lb drs . . . . lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls. . lb.	. . .	.04¼	. . .	.04¼	.03¾	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs . . . . ton	23.50	24.50	23.50	27.00	24.50	32.00
J2 bgs . . . . ton	. . .	15.00	15.00	15.75	15.75	18.00
R2 bgs . . . . ton	. . .	15.25	16.00	16.50	16.25	18.00
Naphtha. v.m. & p. (deodorized)						
see petroleum solvents.						
Naphtha, Solvent, water-white,						
tks . . . . gal.	. . .	.30	.26	.30	.26	.30
drs, c-l . . . . gal.	. . .	.35	.31	.35	.31	.35
Naphthalene, dom, crude, bgs,						
wks . . . . lb.	. . .	3.00	1.65	3.00	. . .	. .
Imported, cif, bgs . . . . lb.	. . .	. . .	1.90	3.00	1.75	1.90
Dyestuffs, bgs, bbls, Eastern						
wks . . . . lb.	.06	.07	.04¼	.07	. . .	. . .
Balls, flakes, pks . . . . . lb.	. . .	.07¼				
Balls, ref'd, bbls, Eastern						
wks . . . . lb.	. . .	.06¾	.04½	.06¾	. . .	. . .
Flakes, ref'd, bbls, Eastern						
wks . . . . lb.	. . .	.06¾	.04½	.06¾	. . .	. . .
Dyestuffs, bgs, bbls, Mid-						
West wks . . . . lb. *q*	.06½	.07½	.04¾	.07½	. . .	. . .
Balls, ref'd, bbls, Mid-West						
wks . . . . lb. *q*	. . .	.07¼	.05	.07½	. . .	. . .
Flakes, ref'd, bbls, Mid-						
West wks . . . . lb. *q*	. . .	.07¼	.05	.07¼	. . .	. . .
Nickel Carbonate, bbls. . . . lb.	. . .	.36	.35	.36	. . .	. . .
Chloride, bbls . . . . lb.	.18	.19	.18	.19	.18	.19
Oxide, 100 lb kgs, NY. . lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY . . . lb.	.13	.13½	.12½	.13½	.11½	13
Single, 400 lb bbls, NY lb.	.13	.13½	.11½	.13½	.11½	.12
Metal ingot . . . . lb.	. . .	.35	. . .	.35	.35	.35
Nicotine, free 50%, 8 lb tins,						
cases	8.25	10.15	8.25	10.15	8.25	10.15
Sulfate, 55 lb drs . . . . . . lb.	.77	.80	.67	.80	.67	.75
Nitre Cake, blk . . . . ton	12.00	14.00	12.00	14.00	12.00	14.00
Nitrobenzene, redistilled, 1000						
lb drs, wks . . . . lb.	.09	.11	.09	.11	.09	.11
tks . . . . lb.	. . .	.08½	. . .	.08½	. . .	.08½
Nitrocellulose, c-l-l cl, wks lb.	.27	.34	.27	.34	.27	.34
Nitrogenous Mat'l, bgs, imp unit	. . .	2.30	2.20	2.75	. . .	. . .
dom, Eastern wks . . . . unit	. . .	2.25	2.20	2.40	2.35	3.25
dom, Western wks . . . . unit	. . .	1.90	1.90	2.30	. . .	. . .
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bgs . . . . . lb.	.16	.18	.12	.18	.18	.20
Chinese, bgs . . . . lb.	.19	.20	.19	.20	.17	.20
Oak Bark Extract, 25%, bbls lb.	. . .	.03½	. . .	.03½	.03⅛	.03½
tks . . . . lb.	. . .	.02¾	. . .	.02¾	. . .	. . .
Octyl Acetate, tks, wks . . . lb.	. . .	.15	. . .	. . .	. . .	. . .
Orange-Mineral, 1100 lb cks						
NY . . . . lb.	.10	.10½	.09¼	.10½	.09¼	.10½
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.84	.82	.84	.82	1.15
Orthochlorophenol, drs . . . . lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drs . . . . lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000						
lb drs . . . . lb.	.05½	.06	.05½	.06	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Orthonitrochlorobenzene, 1200 lb drs, wks ....lb.	.28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ....lb.	.07	.10	.05½	.10	.05½	.06
Orthonitrophenol, 350 lb drs ....lb.	.52	.80	.52	.80	.52	.80
Orthotoluidine, 350 lb bbls, l-c-l ....lb.	.14½	.15	.14½	.15	.14	.15
Orthonitroparachlorphenol, tins ....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, cryst .....lb.	.17	.25	.17	.25	.16	.25
51 deg liquid ....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Powd, 100 lb bgs ......lb.	.14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs						
122-127 deg M P ....lb.	.04	.04¾	.04	.04¾	.04½	.04¾
128-132 deg M P ....lb.	.05	.0515	.05	.0515	.04¾	.0515
133-137 deg M P ....lb.	.0575	.06	.0575	.06	.05	.06
Para aldehyde, 110-55 gal drs ....lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ....lb.	...	.85	...	.85	.52	.85
Aminohydrochloride, 100 lb kgs ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	.78	1.05
Chlorophenol, drs ......lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drs ..lb.	...	...	...	...	...	...
Cymene, refd, 110 gal dr ....gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene 150 lb bbls wks ....lb.	.16	.20	.16	.20	.16	.20
Formaldehyde, bbls, wks lb.	.38	.39	.38	.39	...	...
Nitroacetanilid, 300 lb bbls ....lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ....lb.	.47	.51	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ....lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.35	.37	.35	.37	.35	.37
Phenylenedamine, 350 lb bbls ....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Para Tertiary amyl phenol, wks, drs ....lb.	.32	.50	.32	.50	.32	.50
Toluenesulfonamide, 175 lb bbls ....lb.	.70	.75	.70	.75	.70	.75
tks, wks ....lbs.	...	.31	...	.31	...	...
Toluenesulfonchloride, 410 lb bbls, wks ....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ....lb.	.56	.60	.56	.60	.56	.60
Paris Green, Arsenic Basis						
100 lb kgs ....lb.	...	.24	...	.24	.23	.24
250 lb kgs ....lb.	...	.22	...	.22	...	.22
Perchlorethylene, 50 gal drs ....lb.	...	.15	...	.15	...	.15
Persian Berry Ext, bbls ..lb.	.55	Nom.	.55	Nom.	.55	Nom.
Pentane, normal, 28-38°C, group 3 tks ....gal.	...	.09	...	.09	.09	.09
drs, group 3 ....gal.	.10	.15	.10	.15	...	...
Petrolatum, dark amber, bbls ....lb.	.02⅝	.02⅞	.02	.02⅞	...	...
Light, bbls ....lb.	.03⅛	.03⅜	.02½	.03⅜	...	...
Medium, bbls ....lb.	.02⅞	.03⅛	.02¼	.03⅛	...	...
Dark green, bbls ....lb.	.02½	.02¾	.02½	.02¾	...	...
White, lily, bbls ....lb.	.06	.06¼	.05¼	.06½	...	...
White, snow, bbls ......lb.	.07	.07¼	.06¼	.07½	...	...
Red, bbls ....lb.	.02⅝	.02⅛	.02¼	.02⅞	...	...
Petroleum Ether, 30-60°, group 3, tks ....gal.	...	.13	...	.13	.11	.13
drs, group 3 ....gal.	.15	.16	.15	.16	.15	.17
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks ....gal.	.06⅞	.07¼	.06⅞	.07¼	...	...
Bayonne, tks, wks ..gal.	...	.09	...	.09	...	...
West Coast, tks ....gal.	...	.15	...	.15	...	...
Hydrogenated naphthas, frt allowed East, tks ...gal.	...	.16	.15	.17½	...	...
No. 2, tks ....gal.	...	.18	.18	.22½	...	...
No. 3, tks ....gal.	...	.15	.15	.17½	...	...
No. 4, tks ....gal.	...	.18	.18	.22½	...	...
Lacquer diluents, tks, Bayonne ....gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ....gal.	.07⅞	.08	.07⅞	.08	.06⅞	.08⅜
Naphtha, V.M.P., East, tks, wks ....gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks ...gal.	.06⅞	.07¼	.06⅞	.07¼	.06¼	.07¼
Petroleum thinner, East, tks, wks ....gal.	...	.09	...	.09	.09	.09
Group 3, tks, wks ...gal.	.05⅞	.06⅛	.05⅞	.06¼	.05⅞	.06⅜
Rubber Solvents, stand grd, East, tks, wks ......gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks ..gal.	.06⅞	.07¼	.06⅞	.07¼	.06⅜	.06⅞
Stoddard Solvent, East, tks, wks ....gal.	...	.09	...	.09	.09	.09½
Group 3, tks, wks ...gal.	.06⅜	.07	.06⅜	.07	.05¾	.07⅛
Phenol, 250-100 lb drs ....lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .....lb.	...	.16	...	.16	...	.16
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phloroglucinol, tech, tins ..lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ....lb.	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock
Rosin Oil

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ....ton	...	1.85	1.85	3.40	2.85	3.25
70% basis ....ton	...	2.35	2.35	3.90	3.35	3.90
72% basis ....ton	...	2.85	2.85	4.40	3.85	4.40
75-74% basis ....ton	...	3.85	3.85	5.40	4.90	5.40
75% basis ....ton	...	4.35	4.35	5.50	5.05	5.50
Tennessee, 72% basis ..ton	...	4.50	4.50	4.75	4.75	5.00
Phosphorous Oxychloride 175 lb cyl ....lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ....lb.	.44	.45	.44	.45	.44	.45
Yellow, 110 lb cs, wks..lb.	.28	.33	.28	.33	.28	.33
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ....lb.	.16	.20	.16	.20	.16	.20
Phthalic Anhydride, 100 lb drs, wks ....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.44	.46	.44	.50	.48	.62
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks ....gal.	...	.59	...	.59	...	...
Straw color, bbls ....gal.	...	.59	...	.59	...	...
tks ....gal.	...	.54	...	.54	...	...
Pitch Hardwood, wks ....ton	...	15.00	15.00	20.00	...	20.00
Burgundy, dom, bbls, wks ....lb.	...	.03½	...	.03½	...	...
Imported ....lb.	.11	.13	.11	.13	...	...
Coaltar, bbls, wks ....ton	...	19.00	...	19.00	...	...
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	3.75	4.25	3.75	4.25	...	...
Stearin, drs ....lb.	.03	.04½	.03	.04½	...	...
Platinum, refd ....oz.	34.50	38.00	35.00	38.00	35.00	38.00
POTASH						
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.07⅜
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.08¼
Liquid tks ....lb.	...	.02⅞	...	.02⅞	.02⅞	.03⅝
Potash Salts, Rough Kainit 14% basis ....ton	...	8.50	...	8.50	8.50	9.70
Manure Salts, imported						
20% basis, blk ....ton	...	11.00	8.60	11.00	8.60	12.00
30% basis, blk ....ton	...	14.40	12.90	14.40	12.90	19.15
Domestic, cif ports, blk unit	...	.43	...	.43	...	...
Potassium Acetate ....lb.	.26	.28	.26	.28	.26	.28
Potassium Muriate, 80% basis bgs ....ton	...	22.50	22.00	22.50	22.00	37.15
Dom, blk ....unit	...	.45	.40	.45	...	...
Pot & Mag Sulfate, 48% basis bgs ....ton	22.25	22.50	19.50	22.50	22.50	25.00
Potassium Sulfate, 90% basis bgs ....ton	...	33.75	33.75	35.00	35.00	42.15
Potassium Bicarbonate, USP 320 lb bbls ....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb cks ....lb.	.08½	.09	.08⅛	.09	.08⅛	.08⅝
Binoxalate, 300 lb bbls..lb.	.22	.23	.22	.23	.14	.23
Bisulfate, 100 lb kgs ..lb.	.35	.36	.35	.36	.33	.36
Carbonate, 80-85% calc 800 lb cks ....lb.	.07¼	.07½	.07½	.07⅞	.07	.07⅞
liquid, tks ....lb.	...	...	...	...	...	...
drs, wks ....lb.	.03½	.03¾	...	...	...	...
Chlorate crys, powd, 112 lb kgs, wks ....lb.	...	.09¾	...	.09¾	.08½	.09¾
gran, kgs ....lb.	.12	.13	.12	.13	...	...
powd, kgs ....lb.	.08¾	.09¾	.08¾	.09¾	...	...
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.60
Iodide, 75 lb bbls ....lb.	...	1.25	1.25	1.40	1.40	2.70
Metabisulfite, 300 lb bbls lb.	...	.15	...	.15	.10½	.15
Oxalate, bbls ....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, cks, wks ...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, 112 lb kgs lb.	.35	.38½	.35	.38½	.35	.39
Yellow, 500 lb casks ..lb.	.18	.19	.18	.19	.18	.19
Tartrate Neut, 100 lb kgs lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls ....lb.	.32	.35	.32	.35	.32	.35
Propane, group 3, tks	...	.07	...	.07	...	.07
Pumice Stone, lump bgs ..lb.	.04½	.06	.04½	.06	.04½	.06
250 lb bbls ....lb.	.05	.07	.05	.07	.05	.07
Powd, 350 lb bgs ....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs ....100 lb.	...	2.75	...	2.75	2.25	2.75
Linseed Oil, kgs ...100 lb.	...	4.50	...	4.50	4.00	4.50
Pyridine, 50 gal drs ....gal.	...	1.30	1.20	1.30	...	1.25
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins ....lb.	2.40	2.75	2.40	3.00	2.75	3.00
Quebracho, 35% liq tks ...lb.	...	.02⅝	...	.02⅝	.02¼	.02⅝
450 lb bbls, c-l ....lb.	...	.03⅛	...	.03⅛	.02¾	.03⅛
Solid, 63%, 100 lb bales cif ....lb.	...	.03⅝	...	.03⅝	.02⅞	.03⅝
Clarified, 64%, bales..lb.	...	.03⅞	...	.03⅞	.03	.03⅞
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.06	.06½	.06	.06½	.05½	.06½
Solid, 100 lb boxes ....lb.	.10	.12	.10	.12	.09½	.13
R Salt, 250 lb bbls, wks ..lb.	.52	.57	.44	.45	.40	.45
Resorcinol tech, cans ....lb.	.75	.80	.75	.80	.65	.80
Rochelle Salt, cryst ....lb.	.14	.14½	.14	.15	.12½	.16
Powd, bbls ....lb.	.13	.13½	.13	.13½	...	...
Rosin Oil, bbls, first run gal.	...	.38	.36	.45	.45	.48
Second run ....gal.	...	.45	.43	.48	.48	.53
Third run, drs ....gal.	...	.53	.50	.60	...	...

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	5.20	4.65	5.65	4.50	5.70
D	...	5.25	5.02½	5.75	4.60	5.85
E	...	5.45	5.15	5.90	4.80	6.50
F	...	5.50	5.20	5.95	5.00	6.75
G	...	5.52½	5.25	6.00	5.05	6.75
H	...	5.62½	5.25	6.00	5.10	6.75
I	...	5.75	5.25	6.00	4.05	5.20
K	...	5.90	5.27½	6.05	5.30	6.75
M	...	5.95	5.35	6.10	5.45	6.80
N	...	6.10	5.75	6.40	5.50	6.80
WG	...	6.40	5.95	6.87½	5.70	6.80
WW	...	6.85	6.25	7.55	5.90	6.85
Rosins, Gum, Savannah (280 lb unit):						
B	...	4.00	3.40	4.40	...	...
D	...	4.02½	3.70	4.50	...	...
E	...	4.22½	3.90	4.65	...	...
F	...	4.27½	3.95	4.70	...	...
G	...	4.32½	4.00	4.75	...	...
H	...	4.37½	4.00	4.75	...	...
I	...	4.52½	4.00	4.75	...	...
K	...	4.67½	4.02½	4.80	...	...
M	...	4.70	4.10	4.85	...	...
N	...	4.85	4.50	5.15	...	...
WG	...	5.15	4.70	5.60	...	...
WW	...	5.60	5.15	6.25	...	...
X	...	5.60	5.20	6.25	...	...
Rosins, Wood, wks (280 lb unit), wks, FF	...	4.75	4.05	6.35	...	...
I	...	5.05	4.30	7.00	...	..
M	...	5.30	4.55	7.25	...	...
N	...	5.75	5.00	7.75	...	...
Rosin, Wood. c-l, FF grade, NY	...	5.27	4.92	5.62	5.10	6.13
Rotten Stone, bgs mines ..ton	...	35.00	23.50	35.00	23.50	24.00
Lump, imported, bbls ..lb.	.05	.07	.05	.07	05	.07
Selected, bbls ....lb.	.08	.10	.08	.10	.08	.12
Powdered, bbls ....lb.	.02½	.05	.02½	.05	02½	.05
Sago Flour, 150 lb bgs ....lb.	.02¾	.03¾	.02¾	.03¾	.02½	.03¾
Sal Soda, bbls, wks ..100 lb.	...	1.30	..	1.30	1.10	1.30
Salt Cake, 94-96%, c-l, wks ....ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks ......ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls ......lb.	.059	.06¼	.059	.06¼	.059	.06¼
Powd, bbls ....lb.	.069	.07⅞	069	.07⅞	...	...
Cryst, bbls ....lb.	.069	.08	.069	.08	.	...
Satin, White, 550 lb bbls ..lb.	..	.01⅓		.01⅓	...	.01⅓
Shellac, Bone dry, bbls ..lb. r	.23½	.25½	.19	.32	.26	.37
Garnet, bgs ....lb.	.20	.21	.17	.27	.26	.32
Superfine, bgs ....lb. s	.16½	.19	.16	.28	.23	.31
T. N., bgs ....lb. s	.14½	.17	.13	.25	...	...
Schaeffer's Salt, kgs ......lb.	.48	50	48	.50	.48	.50
Silver Nitrate, vials ......oz.	...	.36⅜	.36⅜	.53¾	.31⅞	.40½
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ....100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.23	...	1.25
blk ....100 lb.	...	1.05	..	1.05	...	1.05
paper bgs ....100 lb.	...	1.20	...	1.20	...	1.20
bbls ....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs ....100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs .....lb.	...	.08	...	.08	.03	.08
Acetate, tech, 450 lb bbls, wks ....lb.	.04½	.05	.04½	.05	.04½	.05
Alignate, drs ....lb.	...	.64	...	.64	.50	.64
Antimoniate, bbls ......lb.	.13¾	.14¼	...	...	...	...
Arsenate, drs ....lb.	...	.10½	...	.10½	.07¾	.10½
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.40	.75
Benzoate, USP, kgs .. lb.	.46	.48	.46	.48	.45	.48
Bicarb, 400 lb bbl, wks. 100 lb.	...	1.85	...	1.85	1.85	1.85
Bichromate, 500 lb cks, wks ....lb.	.06½	.07	.06⅛	.07	.06⅛	.06⅝
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03	.036
35-40% sol cbys, wks 100 lb.	1.95	2.10	1.95	2.10	...	...
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Chloride, tech ....ton	13.60	16.50	13.60	16.50	11.40	16.50
Cyanide, 96-98%, 100 & 250 lb drs, wks ......lb.	.15½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks ....lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.09½
Hydrosulfite, 200 lb bbls, f.o.b. wks ....lb.	.18	.19	.18	.21	.19½	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.40	3.00
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide ....lb.	2.00	2.05	2.00	2.40	2.40	3.50
Metanilate, 150 lb bbls ..lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ....100 lb.	2.65	3.05	2.65	3.05	2.65	3.05
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.02½	...	.02½	...	.02½
Napthenate, drs ....lb.	...	.09	...	.09	.09	.13
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ....ton	...	24.80	...	24.80	24.80	26.30
100 lb bgs ....ton	...	25.50	...	25.50	25.50	27.00
Bulk ....ton	...	23.50	...	23.50	23.50	24.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Sodium (continued)						
Nitrite, 500 lb bbls ....lb.	.0735	.08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.17	.18	.17	.19	.18	.19
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.30	2.20	2.30	2.10	2.40
bgs, wks ......100 lb.	...	2.10	2.00	2.10	...	...
tri-sodium, tech, 325 lb bbls, wks ......100 lb.	...	2.30	2.30	2.70	2.60	2.70
bgs, wks ......100 lb.	...	2.10	2.10	2.60	...	...
Picramate, 160 lb kgs ..lb.	.67	.69	.67	.69	.69	.72
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	.102	.132	.102	.15	...	.15
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	...	.05	.04¼	.05	.04¾	.06
Stannate, 100 lb drs ....lb.	.32½	.34	.31	.38	.33½	.37½
Stearate, bbls ....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks ....100 lb. ‡	1.30	1.55	1.25	2.35	2.20	2.85
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	.02¼	.02½
62% solid, 650 lb drs, c-l, wks ....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.02¼	.02½
Sulfocyanide, bbls .....lb.	.32	.42½	.32	.42½	.28	.42½
Tungstate, tech, crys, kgs ....lb.	...	.90	...	.90	.70	.90
Spruce Extract, ord, tks ..lb.	...	.01	...	.01	...	.01
Ordinary, bbls ....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks ...lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs ....100 lb.	3.13	3.33	3.13	3.78	2.81	3.76
Powd, 140 lb bgs ...100 lb.	3.23	3.43	3.23	3.66	2.71	3.66
Potato, 200 lb bgs ......lb.	.04½	.05½	.04½	.06	.05¼	.06
Imp, bgs ....lb.	.05¾	.06	.05¾	.06½	.06	.06½
Rice, 200 lb bbls ....lb.	...	.07¼	.07¼	.08½	.07½	.08½
Wheat, thick bgs ....lb.	...	.08¼	...	.08¼	.06¼	.08¼
Strontium carbonate, 600 lb. bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY ....lb.	.08¾	.09½	.08¾	.09½	.08¾	.11
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs .....100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks ....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.08½	.10	.08½	.10	.07	.10
Multiple units, wks ....lb.	...	.06½	...	.06½	...	...
tks, wks ....lb.	...	.04¾	...	.04¾	...	...
Refrigeration, cyl, wks ...lb.	...	.13	...	.13	...	...
Multiple units, wks ....lb.	...	.09¼	...	.09¼	...	...
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	54.00	55.00	50.00	65.00	58.00	75.00
dom, bgs, wks ....ton	...	35.00	...	35.00	...	...
Superphosphate, 16% bulk, wks ....ton	...	8.50	8.25	8.50	8.00	8.50
Run of pile ....ton	...	8.00	7.75	8.00	7.50	8.00
Talc, Crude, 100 lb bgs, NY ....ton	14.00	15.00	14.00	15.00	12.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	22.00	30.00	22.00	30.00	27.50	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	70.00	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	75.00	80.00
Tankage Grd, NY ....unit §	...	2.85	2.35	3.00	2.50	3.25
Ungrd ....unit §	...	2.60	2.15	2.50	2.00	2.75
Fert grade, f.o.b. Chicago ....unit §	...	2.75	2.25	2.65	1.80	2.40
South American cif..unit §	...	3.15	2.45	3.15	2.75	3.10
Tapioca Flour, high grade, bgs ....lb.	.0215	.05	.0215	.05	.0215	.05
Tar Acid Oil, 15%, drs gal.	.22½	.23½	.21	.23½	.21	.22
25%, drs ....gal.	.24½	.26½	.23	.26½	.23	.24
Tar, pine, delv, drs .....gal.	.25	.26	.25	.26	...	...
tks, delv ....gal.	...	.20	...	.20	...	...
Tartar Emetic, tech ......lb.	.24¾	.25	.22¾	.25	.23	.23
USP, bbls ....lb.	.28	.28½	.28	.28½	.27	.28½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	...	...
tks ....lb.	.13	.14	.13	.14	...	...
Tetrachlorethane, 50 gal drs lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25

‡ Bags 15c lower; § + 10.

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Tin, crystals, 500 lb bbls, wks ....lb.	.36½	.37	.36	.39½	.30	.40½
Metal, NY ....lb.	...	.486	.456	.52½	.50⅞	.55⅜
Oxide, 300 lb bbls, wks lb.	.54	.56	.51	.58	.55	.60
Tetrachloride, 100 lb drs, wks ....lb.	...	.25	.24¾	.26¾	.25½	.28½
Titanium Dioxide, 300 lb bbls ....lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.19¼
Barium Pigment, bbls ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Calcium Pigment, bbls ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toluidine, mixed, 900 lb drs, wks ....lb.	.27	.28	.27	.28	.27	.28
Toner Lithol, red, bbls ....lb.	.75	.80	.75	.80	.75	.85
Para, red, bbls ....lb.	...	.75	...	.75	.75	.80
Toluidine, bgs ....lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.32	.36
Triamylamine, drs, wks ...lb.	...	1.25	...	1.25	1.00	1.25
Trichlorethylene, 50 gal drs lb.	.09½	.10	.09½	.10	.09½	.10
Triethanolamine, 50 gal drs wks ....lb.	.26	.30	.26	.38	.35	.38
tks, wks ....lb.	...	.25	...	...	...	...
Tricresyl Phosphate, drs ..lb.	.21	.23	.21	.23	.19	.26
Triphenyl Guanidine ....lb.	.58	.60	.58	.60	.58	.60
Tripoli, airfloated, bgs, wks ....ton	27.50	30.00	27.50	30.00	...	...
Tungsten, Wolframite per unit	15.00	15.25	15.00	15.25	12.00	15.25
Turpentine (Spirits), c-l, NY dock, bbls ....gal.	...	.50½	.43¾	.55½	.46¼	.63½
Savannah, bbls ....gal.	...	.45¼	.38¾	.50¼	.41¼	.58½
Jacksonville, bbls ....gal.	...	.45¼	.38¾	.50¼	.41¼	.58½
Wood Steam dist, bbls, c-l, NY ....gal.	...	.49	.43	.50	.41	.61
Urea, pure, 112 lb cases ..lb.	.15½	.17	.15½	.17	.15	.17
Fert grade, bgs c.i.f. ..ton						
c.i.f. S.A. points ....ton	95.00	110.00	100.00	120.00	90.00	120.00
Urea, dom, f.o.b., wks....ton	95.00	110.00	...	...	...	...
Urea Ammonia liq 55% NH_3, tks ....unit	...	.96	...	.96	...	.96
Valonia beard, 42%, tannin bgs ....ton	58.00	nom.	40.00	58.00	39.00	48.00
Cups, 32% tannin, bgs..ton	49.00	nom.	26.00	49.00	23.00	32.50
Mixture, bark, bgs ....ton	...	32.00	...	32.00	...	32.00
Vanillin, ex eugenol, 100 lb tins ....lb.	...	3.75	...	...	...	...
Ex-guaiacol ....lb.	...	3.65	...	...	...	...
Vermillion, English, kgs ..lb.	1.58	1.71	1.48	1.71	1.41	1.73
Vinyl Chloride, 16 lb cyl ..lb.	...	1.00	...	1.00	...	1.00
Wattle Bark, bgs ....ton	...	30.00	29.00	32.00	29.50	34.00
Extract, 60°, tks, bbls ..lb.	...	.03¾	...	.03¾	.03⅝	.03⅞

WAXES

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Wax, Bayberry, bgs ....lb.	.17½	.20	.17½	.23	.25	.30
Bees, bleached, white 500 lb slabs, cases ....lb.	.33½	.34	.33½	.34	.32	.37
Yellow, African, bgs ..lb.	.24	.25	.21	.25½	.16	.22
Brazilian, bgs .... lb.	.24	.26½	.21½	.26½	...	...
Chilean, bgs .... lb.	.24	.26½	.21½	.26½	...	...
Refined, 500 lb slabs, cases ....lb.	.27½	.28	.27½	.28	.21	.29
Candelilla, bgs ....lb.	.16	.17½	.10	.17½	.10¼	.14½
Carnauba, No. 1, yellow, bgs ....lb.	.48	.53	.35	.54	.30	.40
No. 2, yellow, bgs ....lb.	.47	.48	.34	.51	.34	.41
No. 2, N. C., bgs ....lb.	.41	.42	.26½	.43½	.20	.29
No. 3, Chalky, bgs ...lb.	.38	.41	.21	.42½	...	...
No. 3, N. C., bgs ....lb.	.38	.41	.22½	.43	.16¼	.25
Ceresin, white, imp, bgs lb.	.43	.45	.43	.45	...	...
Yellow, bgs ....lb.	.36	.38	.36	.38	...	...
Domestic, bgs ....lb.	.08	.11	.08	.11	...	...
Japan, 224 lb cases ....lb.	.08½	.08¾	.06	.09	.06	.07½
Montan, crude, bgs ....lb.	.10¾	.11¾	.10½	.11¾	.10	.11
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.22	.24	.19	.24	.18	.20
Cakes, cases ....lb.	.23	.25	.20	.25	.19	.21
Whiting, prec 200 lb bgs, c-l, wks ....ton	...	15.00	12.00	15.00	...	...
Alba, bgs, c-l, wks ....ton	...	15.00	...	15.00	...	15.00
Gliders, bgs, c-l, wks ..ton	...	15.00	...	15.00	...	...
Wood Flour, c-l, bgs ....ton	18.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks ....gal.	...	.33	.27	.33	.27	.29
Coml, tks, wks, frt allowed ....gal.	...	.30	.26	.30	...	.26
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36	.37
Zinc, Carbonate tech, bbls, NY ....lb.	.09½	.11	.09½	.11	.09½	.11
Chloride fused, 600 lb drs, wks ....lb.	.04½	.05¾	.04½	.05¾	.04¼	.05¼
Gran, 500 lb bbls, wks ..lb.	.05	.05¾	.05	.05¾	.05⅛	.06
Soln 50%, tks, wks..100 lb.	...	2.00	...	2.00	...	2.00
Cyanide, 100 lb drs ....lb.	.36	.41	.36	.41	.36	.41
Zinc Dust, 500 lb bbls, c-l, delv ....lb.	...	.0685	.057	.0685	.0567½	.071
Metal, high grade slabs, c-l, NY ....100 lb.	...	5.22½	4.05	5.22½	4.05	4.75
E. St. Louis ....100 lb.	...	4.85	3.70	4.85	3.70	4.46
Oxide, Amer, bgs, wks..lb.	.05	.05½	.05	.06¼	.05¾	.06¼
French, 300 lb bbls, wks ....lb.	.05½	.07	.05½	.10⅞	.05¾	.11⅛
Palmitate, bbls ....lb.	.22	.23	.21	.23	.20	.22
Perborate, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Peroxide, 100 lb drs ...lb.	...	1.25	...	1.25	...	1.25
Resinate, fused, dark, bbls lb.	.05¾	.06½	.05¾	.06½	.05¾	.06½
Stearate, 50 lb bbls ....lb.	.19	.22	.18	.22	.18	.21

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Zinc Sulfate, crys, 400 lb bbl, wks ...lb.	.028	.033	.028	.033	.02¾	.033
Flake, bbls ...lb.	.035	.032	.035	.032	...	...
Sulfide, 500 lb bbls, delv lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.13½
bgs, delv ...lb.	.10½	.11½	.10½	.11½	...	...
Sulfocarbolate, 100 lb kgs ...lb.	.24	.25	.24	.25	.21	.25
Zirconium Oxide, Nat kgs lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs ...lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs ...lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1935 Low	1935 High	1934 Low	1934 High
Castor, No. 3, 400 lb bbls..lb.	.10¼	.10¾	.09¾	.10¾	.09¾	.10½
Blown, 400 lb bbls ...lb.	.12¼	.13	.11½	.16	.11½	.12¾
China Wood, bbls spot NY lb.	.14	.14½	.094	.40	.07½	.099
Tks, spot NY ...lb.	.14	.14½	.088	.35	.07¼	.094
Coast, tks ...lb.	.123	.12½	.087	.24	.06⅞	.094
Coconut, edible, bbls NY..lb.	...	.09¾	.04	.12	.04¾	.10¾
Manila, tks, NY ...lb.	...	.04⅝	.03¾	.06¼	.02⅝	.03¾
Tks, Pacific Coast ...lb.	.04½	.04⅜	.03⅜	.06	.02¼	.02½
Cod, Newfoundland, 50 gal bbls ...gal.	.35	.36	.34	.38	.34	.40
Copra, bgs, NY ...lb.	.0245	.025	.02	.038	.0012	.021
Corn, crude, tks, mills ...lb.	.10⅜	.10½	.08¾	.11	.03½	.09½
Refd, 375 lb bbls, NY ..lb.	.12¾	.13	.11½	.14	.05¾	.12
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls, NY ...lb.	.05¼	.06¾	.04½	.06	.02¾	.05½
English, brown, bbls, NY lb.	.04¾	.05½	.04¾	.06½	.03¾	.05⅜
Greases, Yellow ...lb.	.05⅞	.06	.05	.06¾	.02⅜	.05⅛
White, choice bbls, NY lb.	.06⅝	.07½	.05¼	.08½	.02¾	.05⅝
Herring, Coast, tks ...gal.	.33	Nom.	.23	.33	.15	.23
Lard Oil, edible, prime ...lb.	...	.16	.09¾	.20½	...	.09¾
Extra, bbls ...lb.	...	.11½	.08½	.11¾	.07	.08½
Extra, No. 1, bbls ...lb.	...	.10	.08¼	.11	.06⅜	.08¼
Linseed, Raw, less than 5 bbl lots ...lb.	.1110	.1130	.091	.1130	.101	.105
bbls, c-l spot ...lb.	...	.102	.083	.102	.087	.101
Tks ...lb.	...	.096	.0770	.096	.081	.095
Menhaden, tks, Baltimore gal.	...	.36	.25	.36	.15	.25
Refined, alkali, drs ...lb.	.078	.082	.061	.082	.052	.069
Tks ...lb.	...	.072	.055	.072	.046	.061
Light pressed, drs ...lb.	.072	.076	.055	.076	.046	.057
Tks ...lb.	...	.066	.049	.066	.04	.05
Neatsfoot, CT, 20° bbls, NY ...lb.	...	.16¾	.16¼	.16¾	...	.16½
Extra, bbls, NY ...lb.	...	.10¼	.08½	.11¼	.07	.08½
Pure, bbls, NY ...lb.	...	.13¼	.11¾	.13¼	.12	.13
Oleo, No. 1, bbls, NY ...lb.	...	.14⅛	.10¾	.14½	.06	.11½
No. 2, bbls, NY ...lb.	...	.13⅝	.10	.13¾	.05⅜	.11¼
Olive, denat, bbls, NY ...gal.	.80	.81	.82	.95	.76	.90
Edible, bbls, NY ...gal.	1.65	1.90	1.55	1.90	1.55	1.90
Foots, bbls, NY ...lb.	.08½	.08¾	.07⅛	.10	.06½	.07½
Oticica, bbls ...lb.	.13½	.14	.13½	.28	...	...
Palm, Kernel, bulk ...lb.	...	.04½	...	...	...	...
Niger, cks ...lb.	.04⅜	.04½	.034	.05¾	.031	.03¾
Sumatra, tks ...lb.	...	.04½	...	...	...	...
Peanut, crude, bbls, NY ..lb.	...	.10¼	...	...	...	...
Tks, f.o.b. mill ...lb.	...	.09¾	.08¾	.10¾	.06½	.10¾
Refined, bbls, NY ...lb.	...	.13½	.12½	.14	.07½	.12½
Perilla, drs, NY ...lb.	.07⅛	.07½	.07¼	.10¼	.08¼	.09⅝
Tks, Coast ...lb	...	.07	.068	.08½	.07½	.09
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.086	.088	.07½	.09	.08	.082
Denatured, drs. NY ...gal.	...	.56	.40	.56	.37	.44
Red, Distilled, bbls ...lb.	.09⅝	.10⅝	.07⅜	.10⅝	.06⅞	.08⅜
Tks ...lb.	...	.08¾	.06½	.08¾	.06	.06½
Salmon, Coast, 8000 gal tks ...gal.	...	.31	.25	.35	.15	.21
Sardine, Pac Coast, tks ..gal.	...	.37	.24½	.37½	.13	.25
Refined alkali, drs ...lb.	.078	.082	.065	.082	...	...
Tks ...lb.	...	.072	.06	.072	...	...
Light pressed, drs ...lb.	.072	.076	.055	.076	...	...
Tks ...lb.	...	.066	.049	.066	...	...
Sesame, yellow, dom ...lb.	.15	.15½	.12¼	.15½	.07½	.13¼
White, dos ...lb.	.15	.15½	.12¾	.15½	.08	.13¼
Soy Bean, crude						
Dom, tks, f.o.b. mills ..lb.	...	.09	.08	.10	.06	.08
Crude, drs, NY ...lb.	.096	.10	.086	.11	.066	.09
Refd, bbls, NY ...lb.	.101	.11	.091	.115	.071	.102
Tks ...lb.	.095	.10	.08	.10½	...	...
Sperm, 38° CT, bleached, bbls NY ...lb.	.099	.101	.099	.101	.106	.11
45° CT, bleached, bbls, NY ...lb.	.092	.094	.092	.094	.099	.103
Stearic Acid, double pressed dist bgs ...lb.	.10	.11	.10	.12¼	.09	.11
Double pressed saponified bags ...lb.	.10½	.11½	.09	.12¾	.09	.10
Triple pressed dist bgs ..lb.	.12¾	.13¾	.12¾	.15¼	.11¾	.13¾
Stearine, Oleo, bbls ...lb.	.10¼	.10½	.09¼	.12½	.05	.10⅝
Tallow City, extra loose ..lb.	...	.06⅞	.05⅜	.07⅜	.07⅞	.05⅜
Edible, tierces ...lb.	...	.09¼	.07¼	.09¼	.04¾	.07¼
Acidless, tks, NY ...lb.	...	.09¼	.07½	.10¾	.06	.07½
Turkey Red, single, bbls ..lb.	.08	.08½	.07½	.08½	.07½	...
Double, bbls ...lb.	.13	.13½	.12½	.13½	.12½	.13
Whale:						
Winter bleach, bbls, NY lb.	.079	.081	.07	.083	...	.072
Refined, nat, bbls, NY ..lb.	...	.075	.064	.081	.064	.07

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Index to Advertisers

"We"—Editorially Speaking

Our suggestions for the enlivening of chemical advertisements have brought the suggestion that now the industry is 300 years old, some of the companies might adopt the sentimental-historical appeal so well favored in blended whisky publicity. "Dear old Aunt Jemima always served Old Quaker bicarb" seems to be the idea; but somehow "Forty years in the wood" doesn't appeal to us as a winning slogan.

❖❖❖❖

John Chew is certainly slipping—from the front page of the *Satevepost* to a column in the Sunday *Enquirer*.

❖❖❖❖

The chirping prognostications of the Happy New Year interviews this season sound almost as if some of our country's big men had forgotten all about 1930, 1931, 1932, 1933, 1934, and 1935.

❖❖❖❖

To eighteen good friends many, many thanks for reminding us that a hydrocarbon is not a carbohydrate and vice versa.

❖❖❖❖

Referring to the letter from P. A. Patterson in our December issue, we are informed through the grapevine line that Mr. Lammot du Pont does not know.

❖❖❖❖

We cannot help but wonder if that pretty little prospective sent out by the Secretary and Treasurer of the Treasury to all tax-payers, ballyhooing the beautiful U. S. baby bonds, passed the censorship of the S. E. C.

❖❖❖❖

As an authority on zinc we know of no better and his full name is Bruce Robinson Silver. He was born in Roxbury, N. Y., in 1891, and became special representative for Richard Levering & Co. in 1919. Following that he was chief chemist for Dunlop Tire & Rubber Co., and joined the N. J. Zinc Sales Co. in 1922. From 1917 to 1919 he was chemical assistant to Thomas A. Edison for the Naval Consulting board.

❖❖❖❖

Caviar in place of cod liver oil for rickets sounds to us either like Russian propaganda or vitamin boon-doggling. At that, we are in favor of it—not that we have rickets; just as a matter of good taste, we are against cod liver oil.

Chemical news out of Birmingham, Ala., this month indicates that the Swann song has become an advertising slogan.

❖❖❖❖

"We" should like to know who is "the head of an important chemical firm in New England" whose rural retreat in New Hampshire was written up in *This Week*, the syndicated Sunday supplement magazine.

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From an editorial "we" printed in January, 1935: "If Labor is to be coddled and Agriculture subsidized, while Industry is ignored, is it not high time for our lack of confidence to give way to fighting courage? Industry produces sixty per cent. of our national wealth and pays indirectly eighty per cent. of our federal taxes. Industry has given us the highest standards of living the world has ever known. Industry's ten million stockholders are the sound, thrifty group which are our most valuable citizens. Industry is no more responsible than Agriculture or Labor for the international mistakes of the politicians, the juggling of financiers, the speculative orgy of the people which combined to precipitate this depression. Industry is the only element in the nation with the resources and the experience necessary to move us all out of the slough of bankruptcy and unemployment. These facts are apparently not to be reckoned with by the Administration: this should be made plain to the country."

Fifteen Years Ago

From our issues of January, 1921

Silica Gel discovery by Davison Chemical expected to save millions in gases now lost.

Lever Bros. plan consolidation with American Linseed Co.

Viscose Company, Marcus Hook, Pa., resumes operations after brief shutdown. Number of new orders insures production for some time to come.

Dr. Willis R. Whitney awarded Perkin Medal.

N. Y. Paint & Varnish Club holds 173rd annual dinner and meeting at Hotel Astor.

E. E. Adams elected president Air Reduction.

Dr. M. C. Whitaker, U. S. I. Alcohol, addresses meeting New Jersey Chemical Society on "Industrial Management."

Wilbur White Chemical Co., Owego, N. Y., increases capital from $10,000 to $100,000.

Dr. John Teeple addresses Rochester Section, A. C. S. on crisis in the potash industry.

A. G. Bruinier takes over dyestuff business of the Quaker City Corp., and plans for general expansion in operations.

A farmer in a chem. lab. strayed
And (Oh, 'tis sad to tell!)
Mixed glycerine with NO_2
And it blew the J.L.

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Competition this year from *The Murk Retort* ought to pep up *The Chemical Peddler* considerably.

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Does it seem particularly appropriate to you that at the New York Chemical Show, the Philadelphia Gear Works should offer speed reducers?

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The Catalin boys in dinner coats certainly lent a touch of "swank" to the Exposition. Too bad the Show wasn't open in the morning—we might have been able to report "What the Well Dressed Chemical Man Wears 24 Hours a Day" and set up as a rival to *Esquire*.

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Doctor Nieuwland almost cancelled his subscription to CHEMICAL INDUSTRIES when he learned at our booth at the Exposition that we could not supply a complete set of bound copies back to '14. Five minutes' talk with him would convince anyone that he has a pretty keen appreciation of the business side of the industry.

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The Exposition was pretty dull when compared with the '33 Show in that we suffered no $10,000 indium robbery from our Chemicals of Commerce display. That the supposed indium turned out to be dummy sticks of lead only gave the whole *affaire celebre* a humorous turn.

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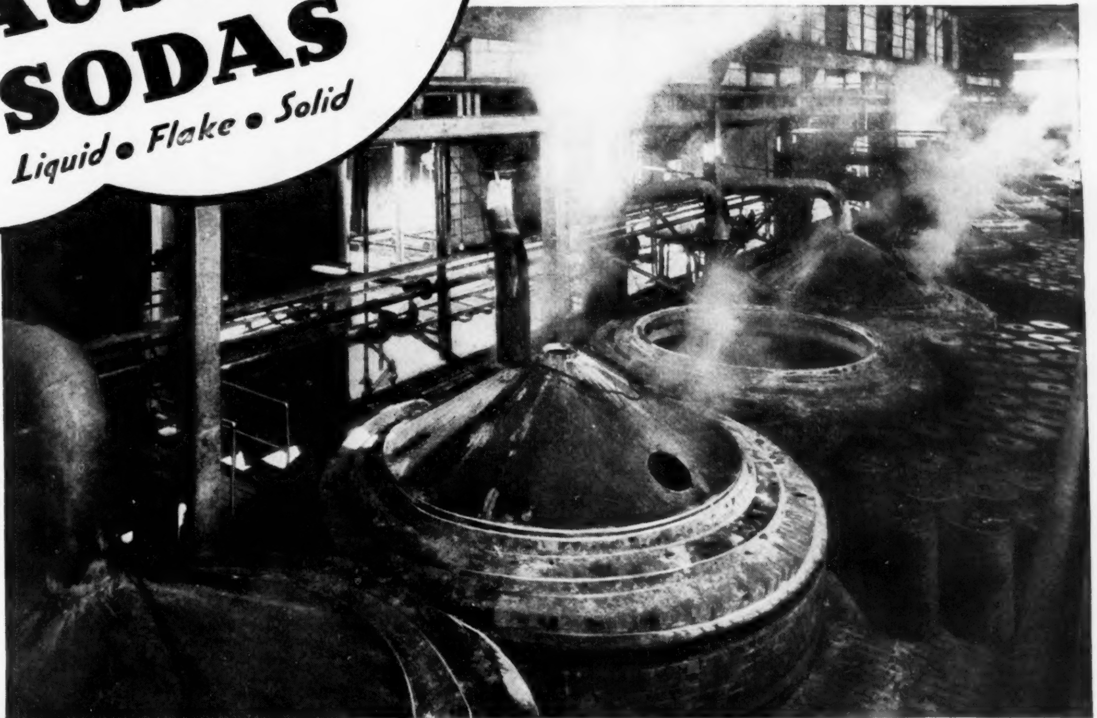
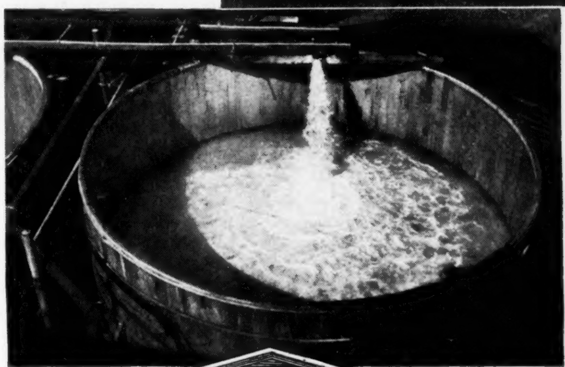
Ten minutes in the atmosphere of the Chemical Show would convince anyone that the industry has very few Corona-Corona smokers.

CAUSTIC SODAS

Liquid • Flake • Solid





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Hydrogen Peroxide
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Di Sodium Phosphate
Tri Sodium Phosphate
Tetra Sodium Pyro Phosphate
Sodium Hypochlorite Solution
Sodium Sulphide
Sulphur Chloride
Yellow and Red
Water Treating Compounds

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The immense facilities and equipment available for caustic soda production has brought to Warner a reputation for dependability as a reliable source of supply to meet any ordinary or extraordinary demands.

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